Column (2) entry	Column (4) entry	Column (10a) revise to read:	Column (10b) revise to read:
Charges, bursting, plastics bonded	UN0457	07	
Charges, bursting, plastics bonded	UN0458	07	
Charges, bursting, plastics bonded	UN0459	06	
Charges, bursting, plastics bonded	UN0460	05	
Charges, demolition	UN0048	03	
Charges, depth	UN0056	03	
Charges, explosive, commercial *without detonator*	UN0442	07	
Charges, explosive, commercial *without detonator*	UN0443	07	
Charges, explosive, commercial *without detonator*	UN0444	06	
Charges, explosive, commercial *without detonator*	UN0445	05	
Charges, propelling	UN0271	07	
Charges, propelling	UN0272	07	
Charges, propelling	UN0415	07	
Charges, propelling	UN0491	06	
Charges, propelling, for cannon	UN0242	10	
Charges, propelling, for cannon	UN0279	10	
Charges, propelling, for cannon	UN0414	10	
Charges, shaped, flexible, linear	UN0237	06	
Charges, shaped, flexible, linear	UN0288	07	
Charges, shaped, *without detonator*	UN0059	07	
Charges, shaped, *without detonator*	UN0439	07	
Charges, shaped, *without detonator*	UN0440	06	
Charges, shaped, *without detonator*	UN0441	05	
Charges, supplementary explosive	UN0060	10	
Components, explosive train, n.o.s	UN0382	11	
Components, explosive train, n.o.s	UN0383	06	
Components, explosive train, n.o.s	UN0384	05	
Components, explosive train, n.o.s	UN0461	11	
Contrivances, water-activated, *with burster, expelling charge or propelling charge*	UN0248	08	8E, 14E, 15E, 17E
Contrivances, water-activated, *with burster, expelling charge or propelling charge*	UN0249	08	8E, 14E, 15E, 17E
Cord, detonating, *flexible*	UN0065	07	
Cord, detonating, *flexible*	UN0289	06	
Cord detonating *or* Fuse detonating *metal clad*	UN0102	07	
Cord, detonating *or* Fuse, detonating *metal clad*	UN0290	07	
Cord, detonating, mild effect *or* Fuse, detonating, mild effect *metal clad*	UN0104	06	
Cord, igniter	UN0066	06	
Cutters, cable, explosive	UN0070	05	
Cyclotetramethylenetetranitramine, desensitized *or* Octogen, desensitized *or* HMX, desensitized.	UN0484	10	
Cyclotetramethylenetetranitramine, wetted *or* HMX, wetted *or* Octogen, *wetted with not less than 15 percent water, by mass*.	UN0226	10	
Cyclotrimethylenetrinitramine, desensitized *or* Cyclonite, desensitized *or* Hexogen, desensitized *or* RDX, desensitized.	UN0483	10	
Cyclotrimethylenetrinitramine, wetted *or* Cyclonite, wetted *or* Hexogen, wetted *or* RDX, wetted *with not less than 15 percent water by mass*.	UN0072	10	
Deflagrating metal salts of aromatic nitroderivatives, n.o.s	UN0132	10	5E
Detonator assemblies, non-electric *for blasting*	UN0360	11	
Detonator assemblies, non-electric *for blasting*	UN0361	06	
Detonator assemblies, non-electric *for blasting*	UN0500	05	
Detonators, electric, *for blasting*	UN0030	11	
Detonators, electric, *for blasting*	UN0255	06	
Detonators, electric *for blasting*	UN0456	05	
Detonators for ammunition	UN0073	11	
Detonators for ammunition	UN0364	11	
Detonators for ammunition	UN0365	06	
Detonators for ammunition	UN0366	05	
Detonators, non-electric, *for blasting*	UN0029	11	
Detonators, non-electric, *for blasting*	UN0267	06	
Detonators, non-electric *for blasting*	UN0455	05	
Diazodinitrophenol, *wetted with not less than 40 percent water or mixture of alcohol and water, by mass*.	UN0074	12	
Diethyleneglycol dinitrate, desensitized *with not less than 25 percent non-volatile, water-insoluble phlegmatizer, by mass*.	UN0075	13	21E
Dinitroglycoluril *or* Dingu	UN0489	10	
Dinitrophenol, *dry or wetted with less than 15 percent water, by mass*	UN0076	10	5E
Dinitrophenolates *alkali metals, dry or wetted with less than 15 percent water, by mass*	UN0077	10	5E
Dinitroresorcinol, *dry or wetted with less than 15 percent water, by mass*	UN0078	10	5E
Dinitrosobenzene	UN0406	10	
Dipicryl sulfide, *dry or wetted with less than 10 percent water, by mass*	UN0401	10	
Explosive, blasting, type A	UN0081	10	21E
Explosive, blasting, type B	UN0082	10	
Explosive, blasting, type B *or* Agent blasting, Type B	UN0331	10	
Explosive, blasting, type C	UN0083	10	22E

Column (2) entry	Column (4) entry	Column (10a) revise to read:	Column (10b) revise to read:
Explosive, blasting, type D	UN0084	10	
Explosive, blasting, type E	UN0241	10	19E
Explosive, blasting, type E *or* Agent blasting, Type E	UN0332	10	
Fireworks	UN0333	07	
Fireworks	UN0334	07	
Fireworks	UN0335	07	
Fireworks	UN0336	06	
Fireworks	UN0337	05	
Flares, aerial	UN0093	07	
Flares, aerial	UN0403	06	
Flares, aerial	UN0404	05	
Flares, aerial	UN0420	07	
Flares, aerial	UN0421	07	
Flares, surface	UN0092	07	
Flares, surface	UN0418	07	
Flares, surface	UN0419	07	
Flash powder	UN0094	15	
Flash powder	UN0305	15	
Fracturing devices, explosive, *without detonators for oil wells*	UN0099	07	
Fuse, igniter *tubular metal clad*	UN0103	06	
Fuse, non-detonating *instantaneous or quickmatch*	UN0101	07	
Fuse, safety	UN0105	05	
Fuzes, detonating	UN0106	11	
Fuzes, detonating	UN0107	11	
Fuzes, detonating	UN0257	06	
Fuzes, detonating	UN0367	05	
Fuzes, detonating, *with protective features*	UN0408	07	
Fuzes, detonating, *with protective features*	UN0409	07	
Fuzes, detonating, *with protective features*	UN0410	06	
Fuzes, igniting	UN0316	07	
Fuzes, igniting	UN0317	06	
Fuzes, igniting	UN0368	05	
Grenades, empty primed	NA0349	05	
Grenades, *hand or rifle, with bursting charge*	UN0284	07	
Grenades, *hand or rifle, with bursting charge*	UN0285	07	
Grenades, *hand or rifle, with bursting charge*	UN0292	08	
Grenades, *hand or rifle, with bursting charge*	UN0293	08	
Grenades, practice, *hand or rifle*	UN0110	05	
Grenades, practice, *hand or rifle*	UN0318	07	
Grenades, practice, *hand or rifle*	UN0372	07	
Grenades, practice, *Hand or rifle*	UN0452	06	
Guanyl nitrosaminoguanylidene hydrazine, wetted *with not less than 30 percent water, by mass.*	UN0113	12	
Guanyl nitrosaminoguanyltetrazene, wetted *or* Tetrazene, wetted *with not less than 30 percent water or mixture of alcohol and water, by mass.*	UN0114	12	
Hexanitrodiphenylamine *or* Dipicrylamine *or* Hexyl	UN0079	10	
Hexanitrostilbene	UN0392	10	
Hexolite, *or* Hexotol *dry or wetted with less than 15 percent water, by mass*	UN0118	10	
Hexotonal	UN0393	10	
Igniters	UN0121	07	
Igniters	UN0314	07	
Igniters	UN0315	07	
Igniters	UN0325	06	
Igniters	UN0454	05	
Jet perforating guns, charged oil well, with detonator	NA0124	07	
Jet perforating guns, charged oil well, with detonator	NA0494	06	
Jet perforating guns, charged, *oil well, without detonator*	UN0124	07	
Jet perforating guns, charged, *oil well, without detonator*	UN0494	06	
Lead azide, wetted *with not less than 20 percent water or mixture of alcohol and water, by mass.*	UN0129	12	
Lead mononitroresorcinate	NA0473	12	
Lead styphnate, wetted *or* Lead trinitroresorcinate, wetted *with not less than 20 percent water or mixture of alcohol and water, by mass.*	UN0130	12	
Lighters, fuse	UN0131	05	
Mannitol hexanitrate, wetted *or* Nitromannite, wetted *with not less than 40 percent water, or mixture of alcohol and water, by mass.*	UN0133	10	
5-Mercaptotertrazol-1-acetic acid	UN0448	09	
Mercury fulminate, wetted *with not less than 20 percent water, or mixture of alcohol and water, by mass.*	UN0135	12	
Mines *with bursting charge*	UN0136	08	
Mines *with bursting charge*	UN0137	03	
Mines *with bursting charge*	UN0138	03	
Mines *with bursting charge*	UN0294	08	

Column (2) entry	Column (4) entry	Column (10a) revise to read:	Column (10b) revise to read:
Model rocket motor	NA0276	06	
Model rocket motor	NA0323	05	
Nitro urea	UN0147	10	
5-Nitrobenzotriazol	UN0385	10	
Nitrocellulose, *dry or wetted with less than 25 percent water (or alcohol), by mass*	UN0340	13	27E
Nitrocellulose, plasticized *with not less than 18 percent plasticizing substance, by mass*	UN0343	10	
Nitrocellulose, *unmodified or plasticized with less than 18 percent plasticizing substance, by mass*.	UN0341	13	27E
Nitrocellulose, wetted *with not less than 25 percent alcohol, by mass*	UN0342	10	
Nitroglycerin, desensitized *with not less than 40 percent non-volatile water insoluble phlegmatizer, by mass*.	UN0143	13	21E
Nitroglycerin, solution in alcohol, *with more than 1 percent but not more than 10 percent nitrogylcerin*.	UN0144	10	21E
Nitroguanidine *or* Picrite, *dry or wetted with less than 20 percent water, by mass*	UN0282	10	
Nitrostarch, *dry or wetted with less than 20 percent water, by mass*	UN0146	10	
Nitrotriazolone *or* NTO	UN0490	10	
Octolite *or* Octol, *dry or wetted with less than 15 percent water, by mass*	UN0266	10	
Octonal	UN0496	10	
Pentaerythrite tetranitrate *or* Pentaerythritol tetranitrate *or* PETN, *with not less than 7 percent wax by mass*.	UN0411	10	
Pentaerythrite tetranitrate, wetted *or* Pentaerythritol tetranitrate, wetted, *or* PETN, wetted *with not less than 25 percent water,* by mass, *or* Pentaerythrite tetranitrate, *or* Pentaerythritol tetranitrate *or* PETN, desensitized *with not less than 15 percent phlegmatizer by mass*.	UN0150	10	
Pentolite, *dry or wetted with less than 15 percent water, by mass*	UN0151	10	
Powder cake, wetted *or* Powder paste, wetted *with not less than 17 percent alcohol by mass*.	UN0433	10	
Powder cake, wetted *or* Powder paste, wetted *with not less than 25 percent water, by mass*.	UN0159	10	
Powder, smokeless	UN0160	.....	26E
Powder, smokeless	UN0161	.....	26E
Primers, cap type	UN0044	05	
Primers, cap type	UN0377	11	
Primers, cap type	UN0378	06	
Primers, tubular	UN0319	07	
Primers, tubular	UN0320	06	
Primers, tubular	UN0376	05	
Projectiles, *inert with tracer*	UN0345	01	
Projectiles, *inert, with tracer*	UN0424	03	
Projectiles, *inert, with tracer*	UN0425	02	
Projectiles, *with burster or expelling charge*	UN0346	03	
Projectiles, *with burster or expelling charge*	UN0347	02	
Projectiles, *with burster or expelling charge*	UN0426	08	
Projectiles, *with burster or expelling charge*	UN0427	08	
Projectiles, *with burster or expelling charge*	UN0434	03	
Projectiles, *with burster or expelling charge*	UN0435	02	
Projectiles, *with bursting charge*	UN0167	08	
Projectiles, *with bursting charge*	UN0168	03	
Projectiles, *with bursting charge*	UN0169	03	
Projectiles, *with bursting charge*	UN0324	08	
Projectiles, *with bursting charge*	UN0344	02	
Propellant, liquid	UN0495	10	
Propellant, liquid	UN0497	10	
Propellant, solid	UN0498	.....	26E
Propellant, solid	UN0499	.....	26E
RDX and HMX mixtures, wetted *with not less than 15 percent water by mass or* RDX and HMX mixtures, desensitized *with not less than 10 percent phlegmatizer by mass*.	UN0391	10	
Release devices, explosive	UN0173	05	
Rivets, explosive	UN0174	05	
Rocket motors	UN0186	03	
Rocket motors	UN0280	03	
Rocket motors	UN0281	03	
Rocket motors, liquid fueled	UN0395	04	23E
Rocket motors, liquid fueled	UN0396	04	23E
Rocket motors with hypergolic liquids *with or without an expelling charge*	UN0250	08	8E, 14E, 15E,
Rocket motors with hypergolic liquids *with or without an expelling charge*	UN0322	08	8E, 14E, 15E,
Rockets, line-throwing	UN0238	07	
Rockets, line-throwing	UN0240	07	
Rockets, line-throwing	UN0453	06	
Rockets, liquid fueled *with bursting charge*	UN0397	04	23E
Rockets, liquid fueled *with bursting charge*	UN0398	04	23E
Rockets, *with bursting charge*	UN0180	08	
Rockets, *with bursting charge*	UN0181	03	

Column (2) entry	Column (4) entry	Column (10a) revise to read:	Column (10b) revise to read:
Rockets, *with bursting charge*	UN0182	03	
Rockets, *with bursting charge*	UN0295	08	
Rockets, *with expelling charge*	UN0436	03	
Rockets, *with expelling charge*	UN0437	03	
Rockets, *with expelling charge*	UN0438	02	
Rockets, *with inert head*	UN0183	03	
Samples, explosive, *other than initiating explosives*	UN0190	14	
Signal devices, hand	UN0191	06	
Signal devices, hand	UN0373	05	
Signals, distress, *ship*	UN0194	07	
Signals, distress, *ship*	UN0195	07	
Signals, railway track, explosive	UN0192	07	
Signals, railway track, explosive	UN0193	05	
Signals, railway track, explosive	UN0492	07	
Signals, railway track, explosive	UN0493	06	
Signals, smoke	UN0196	07	
Signals, smoke	UN0197	06	
Signals, smoke	UN0313	07	
Signals, smoke	UN0487	07	
Sodium dinitro-o-cresolate, *dry or wetted with less than 15 percent water, by mass*	UN0234	10	5E
Sodium picramate, *dry or wetted with less than 20 percent water, by mass*	UN0235	10	5E
Sounding devices, explosive	UN0204	08	
Sounding devices, explosive	UN0296	08	
Sounding devices, explosive	UN0374	07	
Sounding devices, explosive	UN0375	07	
Substances, explosive, n.o.s	UN0357	.....	8E, 14E, 15E, 17E
Substances, explosive, n.o.s	UN0358	.....	8E, 14E, 15E, 17E
Substances, explosive, n.o.s	UN0359	.....	8E, 14E, 15E, 17E
Substances, explosive, n.o.s	UN0473	12	
Substances, explosive, n.o.s	UN0474	10	
Substances, explosive, n.o.s	UN0475	10	
Substances, explosive, n.o.s	UN0476	08	
Substances, explosive, n.o.s	UN0477	10	
Substances, explosive, n.o.s	UN0478	08	
Substances, explosive, n.o.s	UN0479	09	
Substances, explosive, n.o.s	UN0480	09	
Substances, explosive, n.o.s	UN0481	05	
Substances, explosive, n.o.s	UN0485	08	
Substances, explosive, very insensitive, n.o.s., *or* Substances, EVI, n.o.s	UN0482	10	
Tetranitroaniline	UN0207	10	
Tetrazol-1-acetic acid	UN0407	09	
Torpedoes, liquid fueled, *with inert head*	UN0450	04	23E
Torpedoes, liquid fueled, *with or without bursting charge*	UN0449	04	23E
Torpedoes *with bursting charge*	UN0329	03	
Torpedoes *with bursting charge*	UN0330	08	
Torpedoes *with bursting charge*	UN0451	03	
Toy Caps	NA0337	05	
Tracers for ammunition	UN0212	07	
Tracers for ammunition	UN0306	06	
Trinitro-meta-cresol	UN0216	10	5E
Trinitroaniline *or* Picramide	UN0153	10	
Trinitroanisole	UN0213	10	
Trinitrobenzene, *dry or wetted with less than 30 percent water, by mass*	UN0214	10	
Trinitrobenzenesulfonic acid	UN0386	10	5E
Trinitrobenzoic acid, *dry or wetted with less than 30 percent water, by mass*	UN0215	10	5E
Trinitrochlorobenzene *or* Picryl chloride.	UN0155	10	
Trinitrofluorenone	UN0387	10	
Trinitronaphthalene	UN0217	10	
Trinitrophenetole	UN0218	10	
Trinitrophenol *or* Picric acid, *dry or wetted with less than 30 percent water, by mass*	UN0154	10	5E
Trinitrophenylmethylnitramine *or* Tetryl.	UN0208	10	
Trinitroresorcinol *or* Styphnic acid, *dry or wetted with less than 20 percent water, or mixture of alcohol and water, by mass.*	UN0219	10	5E
Trinitroresorcinol, wetted *or* Styphnic acid, wetted *with not less than 20 percent water, or mixture of alcohol and water by mass.*	UN0394	10	5E
Trinitrotoluene and Trinitrobenzene mixtures or TNT and trinitrobenzene mixtures *or* TNT and hexanitrostilbene mixtures or Trinitrotoluene and hexanitrostilnene mixtures.	UN0388	10	
Trinitrotoluene mixtures containing Trinitrobenzene and Hexanitrostilbene *or* TNT mixtures containing trinitrobenzene and hexanitrostilbene.	UN0389	10	
Trinitrotoluene *or* TNT, *dry or wetted with less than 30 percent water, by mass*	UN0209	10	
Tritonal	UN0390	10	
Urea nitrate, *dry or wetted with less than 20 percent water, by mass*	UN0220	10	
Warheads, rocket *with burster or expelling charge*	UN0370	02	

Column (2) entry	Column (4) entry	Column (10a) revise to read:	Column (10b) revise to read:
Warheads, rocket *with burster or expelling charge*	UN0371	08	
Warheads, rocket *with bursting charge*	UN0286	03	
Warheads, rocket *with bursting charge*	UN0287	03	
Warheads, rocket *with bursting charge*	UN0369	08	
Warheads, torpedo *with bursting charge*	UN0221	03	
Zirconium picramate, *dry or wetted with less than 20 percent water, by mass.*	UN0236	10	5E

13. In Appendix B to § 172.101, paragraphs 1. and 2. would be revised and the List of Marine Pollutants would be amended by removing 73 entries, adding 2 entries and revising 2 entries in appropriate alphabetical order to read as follows:

Appendix B to § 172.101—List of Marine Pollutants

1. See § 171.4 of this subchapter for applicability of marine pollutants. This appendix lists potential marine pollutants as defined in § 171.8 of this subchapter.

2. Marine pollutants listed in this appendix are not necessarily listed by name in the § 172.101 Table. If a marine pollutant not listed by name or by synonym in the § 172.101 Table meets the definition of any hazard Class 1 through 8, then you must determine the class and division of the material in accordance with § 173.2a of this subchapter. You must also select the most appropriate hazardous material description and proper shipping name. If a marine pollutant not listed by name or by synonym in the § 172.101 Table does not meet the definition of any Class 1 through 8, then you must offer it for transportation under the most appropriate of the following two Class 9 entries: ''Environmentally hazardous substances, liquid, n.o.s.,'' UN3082, or ''Environmentally hazardous substances, solid, n.o.s.,'' UN3077.

* * * * *

LIST OF MARINE POLLUTANTS

S.M.P. (1)	Marine pollutant (2)
[Remove:]	Acetal
	Acetaldehyde
	Amyl mercaptans
	Anisole
	Benzaldehyde
	Butyl benzenes
	n-Butyl butyrate
	Butylphenols, liquid
	Butylphenols, solid
	Butyraldehyde
	Calcium naphthenate
	Camphor oil
	Chlorotoluenes (ortho-, meta-, para-)
	Coal tar
	Coal tar naphtha
	Creosote (coal tar)
	Creosote (wood tar)
	Cresols (o-; m-; p-)
	Cresylic acid
	Cresylic acid sodium salt
	normal-Decaldehyde
	normal-Decanol
	Decyl acrylate
	Dichlorobenzene (meta; ortho; para)
	Dichlorophenols, liquid
	Dichlorophenols, solid
	2,4-Dichlorophenoxyacetic acid (see also 2,4D)
	2,4 Dichlorophenoxyacetic acid diethanolamine salt
	2,4 Dichlorophenoxyacetic acid dimethylamine salt
	2,4-Dichlorophenoxyacetic acid triisopropylamine salt
	Diethybenzenes (mixed isomers)
	Diisopropylnaphthalene
	Dimethyl disulphide
	Dimethyl glyoxal (butanedione)
	Dimethyl sulphide
	Diphenyl ether
	Diphenyl ether/biphenyl phenyl ether mixtures
	Diphenyl/diphenyl ether (mixtures)
	EPTC (ISO)
	Ethyl acrylate, inhibited
	2-Ethylbutyraldehyde
	2-Ethylhexenal
	Ethyl chlorothioformate
	2,4-Hexadiene aldehyde
	normal-Hexaldehyde

LIST OF MARINE POLLUTANTS—Continued

S.M.P.	Marine pollutant
(1)	(2)
	Iron oxide, spent
	Iron sponge, spent
	Isobutyl aldehyde
	Isobutyl isobutyrate
	Isobutyl priopionate
	Isobutyraldehyde
	Isodecaldehyde
	Isodecanol
	Isononanol
	Isooctanol
	Isopropylbenzene
	Isovaleraldehyde
	1-Methyl-4-ethylbenzene
	2-Methyl-5-ethylpyridine
	Methyl salicylate
	2-Methylbutyraldehyde
	Methylnaphthalenes, liquid
	Methylnaphthalenes, solid
	Naphthalene, crude *or* refined
	Naphthalene, molten
	Naphthenic acids, liquid
	Naphthenic acids, solid
	Nitrocresols
	Nitrotolueunes (ortho-;meta-;para-), liquid
	Nitrotoluenes (ortho-;meta-;para-), solid
	1-Nonanal
	1-Nonanol
	1-Octanol
	alpha-Pinene
	Propanethiols
	Propionaldehyde
	n-Propylbenzene
	Styrene monomer, inhibited
	n-Tetramethylbenzenes
	4-Thiapentanal
	1,2,3-Trimethylbenzene
	1,2,4-Trimethyl benzene
	1,3,5-Trimethyl benzene
	Turpentine
	1-Undecanol
	normal-Valeraldehyde
	Vinyltoluenes, inhibited *mixed isomers*
	Xylenols
[Add:]	
* * * * * * *	
	Chlorotoluenes (meta-;para-)
* * * * * * *	
	Desmedipham
* * * * * * *	
PP	Diclofop-methyl
* * * * * * *	
	Dichlorobenzene (para)
* * * * * * *	
	Diisopropylnaphthalenes, mixed isomers
* * * * * * *	
PP	Fenchlorazole-ethyl
* * * * * * *	
PP	Fenoxapro-ethyl
* * * * * * *	
PP	Fenoxaprop-P-ethyl
* * * * * * *	
	Linuron

LIST OF MARINE POLLUTANTS—Continued

S.M.P. (1)	Marine pollutant (2)
* * * * * * *	
PP	Silafluofen
* * * * * * *	
PP	1,2,3-Trichlorobenzene
* * * * * * *	
[Revise:]	
* * * * * * *	
PP	Dodecyl hydroxypropyl sulfide
* * * * * * *	

14. In § 172.102, in paragraph (c)(1), Special Provisions 43, 110, 128 and 136 would be revised and Special Provisions 139, 142 and 143 would be added; paragraph (c)(3) introductory text, Special Provisions B53 and B69 and paragraphs (c)(4) and (c)(7) would be revised; and in paragraph (c)(8), Specials Provisions W7, W8 and W9 would be added in numerical order to read as follows:

§ 172.102 Special provisions.

* * * * *

(c) * * *

(1) * * *

Code/Special Provisions

* * * * *

43 The membrane filters, including paper separators and coating or backing materials, that are present in transport, must not be able to propagate a detonation as tested by one of the tests described in the UN Manual of Tests and Criteria, Part I, Test series 1(a). On the basis of the results of suitable burning rate tests, and taking into account the standard tests in the UN Manual of Tests and Criteria, Part III, subsection 33.2.1, nitrocellulose membrane filters in the form in which they are to be transported that do not meet the criteria for a Division 4.1 material are not subject to the requirements of this subchapter. Packagings must be so constructed that explosion is not possible by reason of increased internal pressure. Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to the requirements of this subchapter when contained individually in an article or a sealed packet.

* * * * *

110 Fire extinguishers transported under UN1044 may include installed actuating cartridges (cartridges, power device of Division 1.4C or 1.4S), without changing the classification of Division 2.2, provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per extinguishing unit.

* * * * *

128 Regardless of the provisions of § 172.101(c)(12), aluminum smelting by-products, aluminum remelting by-products and coated magnesium granules described under these entries meeting the definition of Class 8, Packing Group II or III, may be classed as a Division 4.3 material and transported under this entry. The presence of a Class 8 hazard must be communicated as required by this part for subsidiary hazards.

* * * * *

136 This entry only applies to machinery and apparatus containing hazardous materials as in integral element of the machinery or apparatus. It may not be used to describe machinery or apparatus for which a proper shipping name exists in the § 172.101 Table. Except when approved by the Associate Administrator, machinery or apparatus may only contain hazardous materials for which exceptions are referenced in Column (8) of the § 172.101 Table and are provided in part 173, subpart D, of this subchapter. Hazardous materials shipped under this entry are excepted from the labeling requirements of this subchapter unless offered for transportation or transported by aircraft and are not subject to the placarding requirements of subpart F of part 173 of this subchapter. Orientation markings as described in § 172.312 (a)(2) are required when liquid hazardous materials may escape due to incorrect orientation. The machinery or apparatus, if unpackaged, or the packaging in which it is contained shall be marked ''Dangerous goods in machinery'' or ''Dangerous goods in apparatus'', as appropriate, with the identification number UN3363. For transportation by aircraft, machinery or apparatus may not contain any material forbidden for transportation by passenger or cargo aircraft. The Associate Administrator may except from the requirements of this subchapter, equipment, machinery and apparatus provided:

a. It is shown that it does not pose a significant risk in transportation;

b. The quantities of hazardous materials do not exceed those specified in § 173.4 of this subchapter; and

c. The equipment, machinery or apparatus conforms with § 173.222 of this subchapter.

* * * * *

139 Use of the ''special arrangement'' proper shipping names for international shipments must be made under an IAEA Certificate of Competent Authority issued by the U.S. Competent Authority in accordance with the requirements in § 173.471, § 173.472, or § 173.473 of this subchapter. Use of these proper shipping names for domestic shipments may be made only under a DOT exemption, as defined in, and in accordance with the requirements of subpart B of part 107 of this subchapter.

* * * * *

142 These hazardous materials may not be classified and transported unless authorized by the Associate Administrator. The Associate Administrator will base the authorization on results from Series 2 tests and a Series 6(c) test from the UN Manual of Tests and Criteria on packages as prepared for transport in accordance with the requirements of this subchapter.

143 These articles may contain:

a. Division 2.2 compressed gases, including oxygen;

b. Signal devices (Class 1) which may include smoke and illumination signal flares. Signal devices must be packed in plastic or fiberboard inner packagings;

c. Electric storage batteries;

d. First aid kits; or

e. Strike anywhere matches.

* * * * *

(3) *''B'' codes.* These provisions apply only to bulk packagings, other than IBCs:

Code/Special Provisions

* * * * *

B53 Packagings must be made of either aluminum or steel.

* * * * *

B69 Dry sodium cyanide or potassium cyanide may be shipped in sift-proof weather-resistant metal covered hopper cars, covered motor vehicles, portable tanks or non-specification bins. Bins must be approved by the Associate Administrator.

* * * * *

(4) *Table 1—IBC Codes and BB Special IBC Packing Provisions.* These

provisions apply only to transportation in IBCs:

TABLE 1.—IBC CODES[1]

IBC Code	Authorized IBCs
IB1	*Authorized IBCs:* Metal (31A, 31B and 31N). *Additional Requirement:* Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized.
IB2	*Authorized IBCs:* Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). *Additional Requirement:* Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130kPa at 55 °C (1.3 bar at 131 °F) are authorized.
IB3	*Authorized IBCs:* Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). *Additional Requirement:* Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized.
IB4	*Authorized IBCs:* Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N).
IB5	*Authorized IBCs:* Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 21HZ1 and 31HZ1).
IB6	*Authorized IBCs:* Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2). *Additional Requirement:* Composite IBCs 11HZ2 and 21HZ2 may not be used when the hazardous materials being transported may become liquid during transport.
IB7	*Authorized IBCs:* Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Wooden (11C, 11D and 11F). *Additional Requirement:* Liners of wooden IBCs must be sift-proof.
IB8	*Authorized IBCs:* Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2).
IB99	IBCs are only authorized if approved by the Associate Administrator.

[1] 1 IBCs may be used for the transportation of hazardous materials when no IBC code is assigned in the § 172.101 Hazardous Materials Table for the specific material if approved by the Associate Administrator.

TABLE 2.—ORGANIC PEROXIDE IBC CODE (IB52)[1]

UN No.	Organic peroxide	Type of IBC	Maximum quantity (liters)	Control temperature (°C)	Emergency temperature (°C)
3109	ORGANIC PEROXIDE, TYPE F, LIQUID				
	tert-Butyl hydroperoxide, not more than 72% with water	31A	1250		
	tert-Butyl peroxyacetate, not more than 32% in diluent type A	31A	1250		
		31HA1	1000		
	tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than 32% in diluent type A.	31A	1250		
		31HA1	1000		
	Cumyl hydroperoxide, not more than 90% in diluent type A	31HA1	1250		
	Dibenzoyl peroxide, not more than 42% as a stable dispersion	31H1	1000		
	Di-tert-butyl peroxide, not more than 52% in diluent type A	31A	1250		
		31HA1	1000		
	1,1-Di-(tert-butylperoxy) cyclohexane, not more than 42% in diluent type A.	31H1	1000		
	Dilauroyl peroxide, not more than 42%, stable dispersion, in water	31HA1	1000		
	Isopropyl cumyl hydroperoxide, not more than 72% in diluent type A.	31HA1	1250		
	p-Menthyl hydroperoxide, not more than 72% in diluent type A	31HA1	1250		
	Peroxyacetic acid, stabilized, not more than 17%	31H1	1500		
		31HA1	1500		
		31A	1500		
3119	ORGANIC PEROXIDE, TYPE F, LIQUID, TEMPERATURE CONTROLLED				
	tert-Butyl peroxy-2-ethylhexanoate, not more than 32% in diluent type B.	31HA1	1000	+30	+35
		31A	1250	+30	+35
	tert-Butyl peroxyneodecanoate, not more than 32% in diluent type A.	31A	1250	0	+10

TABLE 2.—ORGANIC PEROXIDE IBC CODE (IB52)[1]—Continued

UN No.	Organic peroxide	Type of IBC	Maximum quantity (liters)	Control temperature (°C)	Emergency temperature (°C)
	tert-Butyl peroxyneodecanoate, not more than 42% stable dispersion, in water.	31A	1250	−5	+5
	tert-Butyl peroxypivalate, not more than 27% in diluent type B	31HA1	1000	+10	+15
		31A	1250	+10	+15
	Cumyl peroxyneodecanoate, not more than 52%, stable dispersion, in water.	31A	1250	−15	−5
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, not more than 42%, stable dispersion, in water.	31HA1	1000	+30	+35
	Dicetyl peroxydicarbonate, not more than 42%, stable dispersion, in water.	31HA1	1000	+30	+35
	Di-(2-ethylhexyl) peroxydicarbonate, not more than 52%, stable dispersion, in water.	31A	1250	−20	−10
	Dimyristyl peroxydicarbonate, not more than 42%, stable dispersion, in water.	31HA1	1000	+15	+20
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 38% in diluent type A.	31HA1	1000	+10 C	+15
		31A	1250	+10 C	+15
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water.	31A	1250	+10	+15
	1,1,3,3-Tetramethylbutyl peroxyneodecanoate, not more than 52%, stable dispersion, in water.	31A	1250	−5	+5

[1] This IBC Code applies to organic peroxides of type F. For formulations not listed in this table, only IBCs that are approved by the Associate Administrator may be used.

TABLE 3.—BB CODES

BB1	IBCs must be packed in closed freight containers or a closed transport vehicle.
BB2	When IBCs other than metal or rigid plastics IBCs are used, they must be offered for transportation in a closed freight container or a closed transport vehicle.
BB3	Flexible IBCs shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.
BB4	Flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.
BB5	IBCs must be provided with a device to allow venting. The inlet to the venting device must be located in the vapor space of the IBC under maximum filling conditions.
BB6	Non-specification bulk bins are authorized.
BB7	For UN identification numbers 1327, 1363, 1364, 1365, 1386, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC performance tests specified in part 178 of this subchapter.

* * * * *

(7) *''T'' codes.* (i) These provisions apply to the transportation of UN portable tanks. Portable tank instructions specify the requirements applicable to a portable tank when used for the transportation of a specific hazardous material. These requirements must be met in addition to the design and construction specifications in part 178 of this subchapter. Portable tank instructions T1 through T22 specify the applicable minimum test pressure, the minimum shell thickness (in reference steel), bottom opening requirements and pressure relief requirements. In T23, the organic peroxides and self-reactive substances which are authorized to be transported in portable tanks are listed along with the applicable control and emergency temperatures. Liquefied compressed gases are assigned to portable tank instruction T50. T50 provides the maximum allowable working pressures, bottom opening requirements, pressure relief requirements and degree of filling requirements for liquefied compressed gases permitted for transport in portable tanks. Refrigerated liquefied gases which are authorized to be transported in portable tanks are specified in tank instruction T75.

(ii) The following table specifies the portable tank requirements applicable to T Codes T1 through T22. Column 1 specifies the T Code. Column 2 specifies the minimum test pressure, in bar (1 bar = 14.5 psig), at which the periodic hydrostatic testing required by § 173.32b of this subchapter must be conducted. Column 3 specifies the section reference for minimum shell thickness or, alternatively, the minimum shell thickness value. Column 4 specifies the applicability of § 178.275(f)(3) of this subchapter for the pressure relief devices. When the word ''Normal'' is indicated, § 178.275(f)(3) of this subchapter does not apply. Column 5 either references the applicable requirements for bottom openings in part 178 of this subchapter, or references ''Prohibited'' which means bottom openings are prohibited. The table follows:

TABLE OF PORTABLE TANK T CODES

[Portable Tank Instructions: T1–T22—Portable tank instructions. T1–T22 apply to liquid and solid hazardous materials of Classes 3 through 9 which are transported in portable tanks.]

Portable tank instruction (1)	Minimum test pressure (bar) (2)	Minimum shell thickness (in mm-reference steel) (See § 178.274(d)) (3)	Pressure-relief requirements (See § 178.275(f)) (4)	Bottom opening requirements (See § 178.275(c)) (5)
T1	1.5	§ 178.274(d)(2)	Normal	§ 178.274(c)(2).
T2	1.5	§ 178.274(d)(2)	Normal	§ 178.275(c)(3).
T3	2.65	§ 178.274(d)(2)	Normal	§ 178.275(c)(2).
T4	2.65	§ 178.274(d)(2)	Normal	§ 178.275(c)(3).
T5	2.65	§ 178.274(d)(2)	§ 178.275(f)(3)	Prohibited.
T6	4	§ 178.274(d)(2)	Normal	§ 178.275(c)(2).
T7	4	§ 178.274(d)(2)	Normal	§ 178.275(c)(3).
T8	4	§ 178.274(d)(2)	Normal	Prohibited.
T9	4	6 mm	Normal	Prohibited.
T10	4	6 mm	§ 178.275(f)(3)	Prohibited.
T11	6	§ 178.274(d)(2)	Normal	§ 178.275(c)(3).
T12	6	§ 178.274(d)(2)	§ 178.275(f)(3)	§ 178.275(c)(3).
T13	6	6 mm	Normal	Prohibited.
T14	6	6 mm	§ 178.275(f)(3)	Prohibited.
T15	10	§ 178.274(d)(2)	Normal	§ 178.275(c)(3).
T16	10	§ 178.274(d)(2)	§ 178.275(f)(3)	§ 178.275(c)(3).
T17	10	6 mm	Normal	§ 178.275(c)(3).
T18	10	6 mm	§ 178.275(f)(3)	§ 178.275(c)(3).
T19	10	6 mm	§ 178.275(f)(3)	Prohibited.
T20	10	8 mm	§ 178.275(f)(3)	Prohibited.
T21	10	10 mm	Normal	Prohibited.
T22	10	10 mm	§ 178.275(f)(3)	Prohibited.

(iii) The following table specifies the portable tank requirements applicable to T23 for self-reactive substances of Division 4.1 and organic peroxides of Division 5.2 which are authorized to be transported in portable tanks:

PORTABLE TANK INSTRUCTION

[T23—Portable tank instruction. T23 applies to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2.]

UN No.	Hazardous material	Minimum test pressure (bar)	Minimum shell thickness (mm-reference steel)	Bottom opening requirements	Pressure-relief requirements	Filling limits	Control temperature (°C)	Emergency temperature (°C)
3109	Organic peroxide, Type F, liquid.	444444	See § 178.274(d)(2).	See § 178.275(c)(3).	See § 178.275(j)(1).	Not more than 90% at 59 °F (15 °C).		
	tert-Butyl hydroperoxide not more than 72% water. (Provided that steps have been taken to achieve the safety equivalence of 65% tert-Butyl hydroperoxide and 35% water.).		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
	Cumyl hydro-peroxide, not more than 90% in diluent type A.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
	Di-tert-butyl peroxide, not more than 32% in diluent type A.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
	Isopropyl cumyl hydro-peroxide, not more than 72% in diluent type A.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
	p-Menthyl hydro-peroxide, not more than 72% in diluent type A.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
	Pinanyl hydro-peroxide, not more than 50% in diluent type A.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
3110	Organic peroxide, Type F, solid.	4	§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
	Dicumyl peroxide. Maximum quantity per portable tank 2,000 kg.							
3119	Organic peroxide, Type F, liquid, temperature controlled.	444444	See § 178.274(d)(2).	See § 178.275(c)(3).	See § 178.275(j)(1).	Not more than 90% at 59 °F (15 °C).	As approved by Assoc. Admin. for HMS.	As approved by Assoc. Admin. for HMS.

PORTABLE TANK INSTRUCTION—Continued

[T23—Portable tank instruction. T23 applies to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2.]

UN No.	Hazardous material	Minimum test pressure (bar)	Minimum shell thickness (mm-reference steel)	Bottom opening requirements	Pressure-relief requirements	Filling limits	Control temperature (°C)	Emergency temperature (°C)
	tert-Butyl peroxyacetate, not more than 32% in diluent type B.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	+30	+35
	tert-Butyl peroxy-2-ethylhexanoate, not more than 32% in diluent type B.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	+15	+20
	tert-Butyl peroxypivalate, not more than 27% in diluent type B.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	−5	+10
	tert-Butyl peroxy-3,5,5-trimethyl-hexanoate, not more than 32% in diluent type B.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	+35	+40
	Di-(3,5,-trimethyl-hexanoyl) peroxide, not more than 38% in diluent type A.		§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	0	+5
3120	Organic peroxide, Type F, solid, temperature controlled.	4	§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	As approved by Assoc. Admin. for HMS.	As approved by Assoc. Admin. for HMS.
3229	Self-reactive liquid Type F ..	4	§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
3230	Self-Reactive solid Type F	4	§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).		
3239	Self-reactive liquid Type F, temperature controlled.	4	§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	As approved by Assoc. Admin. for HMS.	As approved by Assoc. Admin. for HMS.
3240	Self-reactive solid Type F, temperature controlled.	4	§ 178.274(d)(2) ..	§ 178.275(c)(3) ...	§ 178.275(j)(1)	Not more than 90% at 59 °F (15 °C).	As approved by Assoc. Admin. for HMS.	As approved by Assoc. Admin. for HMS.

(iv) The following portable tank instruction applies to portable tanks used for the transportation of liquefied compressed gases. The T50 table provides the UN identification number and proper shipping name for each liquefied compressed gas authorized to be transported in a T50 portable tank. The following table provides maximum allowable working pressures, bottom opening requirements, pressure relief device requirements and degree of filling requirements for each liquefied compressed gases permitted for transportation in a T50 portable tank:

Note to reader: *We are proposing to revise the word ''stabilized'' in the proper shipping names below to read ''inhibited'' (see preamble discussion under § 172.101).*

PORTABLE TANK INSTRUCTION

[T50—Portable tank instruction 50 applies to liquefied compressed gases.]

UN No.	Non-refrigerated liquefied compressed gasses	Max. allowable working pressure (bar) Small; Bare; Sunshield Insulated	Openings below liquid level	Pressure relief requirements (See § 178.276(e))	Maximum filing density (kg/l)
1005	Ammonia, anhydrous	29.0 25.7 22.0 19.7	Allowed	§ 178.276(e)	0.53
1009	Bromotrifluoromethane *or* Refrigerant gas R 13B1	38.0 34.0 30.0 27.5	.....do	Normal	1.13
1010	Butadienes, stabilized	7.5 7.0 7.0 7.0	.....do	.....do	0.55
1011	Butane	7.0 7.0 7.0 7.0	.....do	.....do	0.51

PORTABLE TANK INSTRUCTION—Continued

[T50—Portable tank instruction 50 applies to liquefied compressed gases.]

UN No.	Non-refrigerated liquefied compressed gasses	Max. allowable working pressure (bar) Small; Bare; Sunshield Insulated	Openings below liquid level	Pressure relief requirements (See § 178.276(e))	Maximum filing density (kg/l)
1012	Butylene	8.0 7.0 7.0 7.0	.....do	.....do	0.53
017	Chlorine	19.0 17.0 15.0 13.5	Not allowed	§ 178.276(e)	1.25
1018	Chlorodifluoromethane *or* Refrigerant gas R 22	26.0 24.0 21.0 19.0	Allowed	Normal	1.03
1020	Chloropentafluoroethane *or* Refrigerant gas R 115	23.0 20.0 18.0 16.0	.....do	.....do	1.06
1021	1-Chloro-1,2,2,2-tetrafluoroethane *or* Refrigerant gas R 124.	10.3 9.8 7.9 7.0	.....do	.....do	1.2
1027	Cyclopropane	18.0 16.0 14.5 13.0	.....do	.....do	0.53
1028	Dichlorodifluoromethane *or* Refrigerant gas R 12	16.0 15.0 13.0 11.5	.....do	.....do	1.15
1029	Dichlorofluoromethane *or* Refrigerant gas R 21	7.0 7.0 7.0 7.0	.....do	.....do	1.23
1030	1,1-Difluoroethane *or* Refrigerant gas R 152a	16.0 14.0 12.4 11.0	.....do	.....do	0.79
1032	Dimethylamine, anhydrous	7.0 7.0 7.0 7.0	.....do	.....do	0.59
1033	Dimethyl ether	15.5 13.8 12.0 10.6	.....do	.....do	0.58
1036	Thylamine	7.0 7.0 7.0 7.0	.....do	.....do	0.61
1037	Ethyl chloride	7.0 7.0 7.0 7.0	.....do	.....do	0.8
1040	Ethylene oxide *with nitrogen up to a total pressure of 1MPa (10 bar) at 50 °C.*	−10	Not allowed	§ 178.276(e)	.078
1041	Ethylene oxide and carbon dioxide mixture *with more than 9% but no more than 87% ethylene oxide.*	[1]	Allowed	Normal	See § 173.32(f)
1055	Isobutylene	8.1 7.0 7.0 7.0	.....do	.....do	0.52
1060	Methyl acetylene and propadiene mixture, stabilized.	28.0 24.5 22.0 20.0	.....do	.....do	0.43

PORTABLE TANK INSTRUCTION—Continued

[T50—Portable tank instruction 50 applies to liquefied compressed gases.]

UN No.	Non-refrigerated liquefied compressed gasses	Max. allowable working pressure (bar) Small; Bare; Sunshield Insulated	Openings below liquid level	Pressure relief requirements (See § 178.276(e))	Maximum filing density (kg/l)
1061	Methylamine, anhydrous	10.8 9.6 7.8 7.0	.....do	.....do	0.58
1062	Methyl bromide	7.0 7.0 7.0 7.0	Not allowed	§ 178.276(e)	1.51
1063	Methyl chloride *or* Refrigerant gas R 40	14.5 12.7 11.3 10.0	Allowed	Normal	.081
1064	Methyl mercaptan	7.0 7.0 7.0 7.0	Not allowed	§ 178.276(e)	0.78
1067	Dinitrogen tetroxide	7.0 7.0 7.0 7.0	....do	§ 178.276(e)	1.3
1075	Petroleum gas, liquefied	(1)	Allowed	Normal	See § 173.32(f)
1077	Propylene	28.0 24.5 22.0 20.0	.....do	.....do	0.43
1078	Refrigerant gas, n.o.s	(1)	.....do	.....do	See § 173.32(f)
1079	Sulphur dioxide	11.6 10.3 8.5 7.6	Not Allowed	§ 178.276(e)	1.23
1082	Trifluorochloroethylene, stabilized *or* Refrigerant gas R 1113.	17.0 15.0 13.1 11.6	.....do	§ 178.276(e)	1.13
1083	Trimethylamine, anhydrous	7.0 7.0 7.0 7.0	Allowed	Normal	0.56
1085	Vinyl bromide, stabilized	7.0 7.0 7.0 7.0	.....do	.....do	1.37
1086	Vinyl chloride, stabilized	10.6 9.3 8.0 7.0	.....do	.....do	0.81
1087	Vinyl methyl ether, stabilized	7.0 7.0 7.0 7.0	.....do	.....do	0.67
1581	Chloropicrin and methyl bromide mixture	7.0 7.0 7.0 7.0	Not allowed	§ 178.276(e)	1.51
1582	Chloropicrin and methyl chloride mixture	19.2 16.9 15.1 13.1	.....do	§ 178.276(e)	0.81
1858	Hexafluoropropylene compressed *or* Refrigerant gas R 1216.	19.2 16.9 15.1 13.1	Allowed	Normal	1.11

PORTABLE TANK INSTRUCTION—Continued

[T50—Portable tank instruction 50 applies to liquefied compressed gases.]

UN No.	Non-refrigerated liquefied compressed gasses	Max. allowable working pressure (bar) Small; Bare; Sunshield Insulated	Openings below liquid level	Pressure relief requirements (See § 178.276(e))	Maximum filing density (kg/l)
1912	Methyl chloride and methylene chloride mixture	15.2 13.0 11.6 10.1	.....do	.....do	0.81
1958	1,2-Dichloro-1,1,2,2-tetrafluoroethane *or* Refrigerant gas R 114.	7.0 7.0 7.0 7.0	.....do	.....do	1.3
1965	Hydrocarbon gas, mixture liquefied, n.o.s	([1])	.....do	.....do	See § 173.32(f)
1969	Isobutane	8.5 7.5 7.0 7.0	.....do	.....do	0.49
1973	Chlorodifluoromethane and chloropentafluoroethane mixture *with fixed boiling point, with approximately 49% chlorodifluoromethane or* Refrigerant gas R 502.	28.3 25.3 22.8 20.3	.....do	.....do	1.05
1974	Chlorodifluorobromomethane *or* Refrigerant gas R 12B1.	7.4 7.0 7.0 7.0	.....do	.....do	1.61
1976	Octafluorocyclobutane *or* Refrigerant gas RC 318	8.8 7.8 7.0 7.0	.....do	.....do	1.34
1978	Propane	22.5 20.4 18.0 16.5	.....do	.....do	0.42
1983	1-Chloro-2,2,2-trifluoroethane *or* Refrigerant gas R 133a.	7.0 7.0 7.0 7.0	.....do	.....do	1.18
2035	1,1,1-Trifluoroethane compressed *or* Refrigerant gas R 143a.	31.0 27.5 24.2 21.8	.....do	.....do	0.76
2424	Octafluoropropane *or* Refrigerant gas R 218	23.1 20.8 18.6 16.6	.....do	.....do	1.07
2517	1-Chloro-1,1-difluoroethane *or* Refrigerant gas R 142b.	8.9 7.8 7.0 7.0	.....do	.....do	0.99
2602	Dichlorodifluoromethane and difluoroethane azeotropic mixture *with approximately 74% dichlorodifluoromethane or* Refrigerant gas R 500.	20.0 18.0 16.0 14.5	.....do	.....do	1.01
3057	Trifluoroacetyl chloride	14.6 12.9 11.3 9.9	Not allowed	§ 178.276(e)	1.17
3070	Ethylene oxide and dichlorodifluoromethane mixture *with not more than 12.5% ethylene oxide*.	14.0 12.0 11.0 9.0	Allowed	§ 178.276(e)	1.09
3153	Perfluoro (methyl vinyl ether)	14.3 13.4 11.2 10.2	.....do	Normal	1.14
3159	1,1,1,2-Tetrafluoroethane *or* Refrigerant gas R 134a.	17.7 15.7 13.8 12.1	.....do	.....do	1.04

PORTABLE TANK INSTRUCTION—Continued

[T50—Portable tank instruction 50 applies to liquefied compressed gases.]

UN No.	Non-refrigerated liquefied compressed gasses	Max. allowable working pressure (bar) Small; Bare; Sunshield Insulated	Openings below liquid level	Pressure relief requirements (See § 178.276(e))	Maximum filing density (kg/l)
3161	Liquefied gas, flammable, n.o.s.	(1)	.....do	.....do	See § 173.32(f)
3163	Liquefied gas, n.o.s.	(1)	.....do	.....do	See § 173.32(f)
3220	Pentafluoroethane *or* Refrigerant gas R 125	34.4 30.8 27.5 24.5	.....do	.....do	0.95
3252	Difluoromethane *or* Refrigerant gas R 32	43.0 39.0 34.4 30.5	.....do	.....do	0.78
3296	Heptafluoropropane *or* Refrigerant gas R 227	16.0 14.0 12.5 11.0	.....do	.....do	1.2
3297	Ethylene oxide and chlorotetrafluoroethane mixture, *with not more than 8.8% ethylene oxide*.	8.1 7.0 7.0 7.0	.....do	.....do	1.16
3298	Ethylene oxide and pentafluoroethane mixture, *with not more than 7.9% ethylene oxide*.	25.9 23.4 20.9 18.6	.....do	.....do	1.02
3299	Ethylene oxide and tetrafluoroethane mixture, *with not more than 5.6% ethylene oxide*.	16.7 14.7 12.9 11.2	.....do	.....do	1.03
3318	Ammonia solution, *relative density less* than 0.880 at 15 °C in water, with more than 50% ammonia.	(1)	.....do	§ 178.276(e)	§ 173.32(f)
3337	Refrigerant gas R 404A	31.6 28.3 25.3 22.5	.....do	Normal	0.84
3338	Refrigerant gas R 407A	31.3 28.1 25.1 22.4	.....do	.....do	0.95
3339	Refrigerant gas R 407B	33.0 29.6 26.5 23.6	.....do	.....do	0.95
3340	Refrigerant gas R 407C	29.9 26.8 23.9 21.3	.....do	.....do	0.95

[1] See MAWP definition in § 178.276(a).

(v) When portable tank instruction T75 is referenced in Column (7) of the § 172.101 Table, the applicable refrigerated liquefied gases are authorized to be transported in portable tanks in accordance with the requirements of § 178.277 of this subchapter.

(vi) When a specific portable tank instruction is specified by a T Code in Column (7) of the § 172.101 Table for a specific hazardous material, a Specification portable tank conforming to an alternative tank instruction may be used if:

(A) the portable tank has a higher or equivalent test pressure (for example, 4 bar when 2.65 bar is specified);

(B) the portable tank has greater or equivalent wall thickness (for example, 10 bar when 6 bar is specified);

(C) the portable tank has a pressure relief device as specified in the T Code or is preceded by a frangible disc when no frangible disc is required. If a frangible disc is required in series with the pressure relief device, the alternative portable tank must be fitted with a frangible disc; and

(D) the portable tank is fitted with bottom openings having two or three effective means of closure or no bottom openings when two effective means of closure are specified; or the portable tank has no bottom openings or three effective means of closure when three effective means of closure are specified. If no bottom openings are authorized, the alternative portable tank must not have bottom openings.

(vii) When a hazardous material is not assigned a portable tank T Code or TP 9 is referenced in Column (7) of the § 172.101 Table, the hazardous material may only be transported in a portable tank if approved by the Associate Administrator.

(viii) Portable tank special provisions are assigned to certain hazardous materials to specify requirements that are in addition to those provided by the portable tank instructions or the requirements in part 178 of this subchapter. Portable tank special provisions are designated with the abbreviation TP (tank provision) and are assigned to specific hazardous materials in Column (7) of the § 172.101 Table. The following is a list of the portable tank special provisions:

Code/Special Provisions

TP1 The maximum degree of filling must not exceed the degree of filling determined by the following (see Note 1 following TP3 for an explanation of the coefficients):

$$\left(\text{Degree of filling} = \frac{97}{1+\alpha\,(tr-tf)}\right).$$

TP2 The maximum degree of filling must not exceed the degree of filling determined by the following (see Note 1 following TP3):

$$\left(\text{Degree of filling} = \frac{95}{1+\alpha\,(tr-tf)}\right).$$

TP3 a. For liquids transported under elevated temperature, the maximum degree of filling is determined by the following:

$$\left(\text{Degree of filling} = 95\frac{dr}{df}\right).$$

Where: α is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (t_f) and the maximum mean bulk temperature during transportation (t_r) both in degrees celsius.

b. For liquids transported under ambient conditions α may be calculated using the formula:

$$\propto = \frac{d_{15} - d_{50}}{35\ d_{50}}$$

Where: d_{15} and d_{50} are the densities of the liquid at 15 °C (59 °F) and 50 °C (122 °F), respectively.

TP4 The maximum degree of filling for portable tanks must not exceed 90%.

TP5 [Reserved.]

TP6 To prevent the tank from bursting in an event, including fire engulfment under the conditions prescribed in CGA pamphlet S–1.2 (see § 171.7 of this subchapter), it must be equipped with pressure relief devices that are adequate in relation to the capacity of the tank and the nature of the hazardous material transported.

TP7 The vapor space must be purged of air by nitrogen or other means.

TP8 A portable tank having a minimum test pressure of 1.5 bar (150 kPa) may be used when the flashpoint of the hazardous material transported is greater than 0 °C (32 °F).

TP9 A hazardous material assigned to special provision TP9 in Column (7) of the § 172.101 Table may only be transported in a portable tank if approved by the Associate Administrator.

TP10 The portable tank must be fitted with a lead lining at least 5 mm (0.2 inches) thick. The lead lining must be tested annually to ensure that it is intact and functional. Another suitable lining material may be used if approved by the Associate Administrator.

TP12 This material is considered highly corrosive to steel.

TP13 Self-contained breathing apparatus must be provided when this hazardous material is transported by sea.

TP16 The tank must be protected against over and under pressurization which may be experienced during transportation. The means of protection must be approved by the approval agency designated to approve the portable tank in accordance with the procedures in subpart E, part 107 of this subchapter. The pressure relief device must be preceded by a frangible disk in accordance with the requirements of § 178.275(f)(3) of this subchapter to prevent crystallization of the product in the pressure relief device.

TP17 Only inorganic non-combustible materials may be used for thermal insulation of the tank.

TP18 The temperature of this material must be maintained between 18 °C (64.4 °F) and 40 °C (104 °F) while in transportation. Portable tanks containing solidified methacrylic acid must not be reheated during transportation.

TP19 The calculated wall thickness must be increased by 3 mm at the time of construction. Wall thickness must be verified ultrasonically at intervals midway between periodic hydraulic tests (every 2.5 years). The portable tank must not be used if the wall thickness is less than that prescribed by the applicable T code in Column (7) of the Table for this material.

TP20 This hazardous material must only be transported in insulated tanks under a nitrogen blanket.

TP21 The wall thickness must not be less than 8 mm. Tanks must be hydraulically tested and internally inspected at intervals not exceeding 2.5 years.

TP22 Lubricants for portable tank fittings must be oxygen compatible.

TP24 The portable tank may be fitted with a device to prevent the build up of excess pressure due to the slow decomposition of the hazardous material being transported. The device must be in the vapor space when the tank is filled under maximum filling conditions. This device must also prevent an unacceptable amount of leakage of liquid in the case of overturning.

TP25 Sulphur trioxide 99.95% pure and above may be transported in tanks without an inhibitor provided that it is maintained at a temperature equal to or above 32.5 °C (90.5 °F).

TP26 The heating device must be exterior to the shell. For UN 3176, this requirement only applies when the hazardous material reacts dangerously with water.

TP27 A portable tank having a minimum test pressure of 4 bar (400 kPa) may be used provided the calculated test pressure is 4 bar or less based on the MAWP of the hazardous material, as defined in § 178.275, where the test pressure is 1.5 times the MAWP.

TP28 A portable tank having a minimum test pressure of 2.65 bar (265 kPa) may be used provided the calculated test pressure is 2.65 bar or less based on the MAWP of the hazardous material, as defined in § 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

TP29 A portable tank having a minimum test pressure of 1.5 bar (150.0 kPa) may be used provided the calculated test pressure is 1.5 bar or less based on the MAWP of the hazardous materials, as defined in § 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

TP30 This hazardous material may only be transported in insulated tanks.

TP31 This hazardous material may only be transported in tanks in the solid state.

TP37 IM portable tanks are only authorized for the shipment of hydrogen peroxide solutions in water containing 72% or less hydrogen peroxide by weight. Pressure relief devices shall be designed to prevent the entry of foreign matter, the leakage of liquid and the development of any dangerous excess pressure. In addition, the portable tank must be designed so that internal surfaces may be effectively cleaned and passivated. Each tank must be equipped with pressure relief devices conforming to the following requirements:

Concentration of hydrogen peroxide solution	Total venting capacity in standard cubic feet per hour (S.C.F.H.) per pound of hydrogen peroxide solution
52% or less	11
Over 52%, but not greater than 60%	22
Over 60%, but not greater than 72%	32

TP38 Each tank must be insulated with an insulating material so that the overall thermal conductance at 15.5 °C (60 °F) is no more than 1.5333 kilojoules per hour per square meter per degree Celsius (0.075 Btu per hour per square foot per degree Fahrenheit) temperature differential. Insulating materials may not promote corrosion to steel when wet.

TP44 Each portable tank must be made of stainless steel, except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(b) of this

subchapter. Thickness of stainless steel for tank shell and heads must be the greater of 7.62 mm (0.300 inch) or the thickness required for a portable tank with a design pressure at least equal to 1.5 times the vapor pressure of the hazardous material at 46 °C (115 °F).

TP45 Each portable tank must be made of stainless steel, except that steel other than stainless steel may be used in accordance with the provisions of 173.24b(b) of this subchapter. Thickness of stainless steel for portable tank shells and heads must be the greater of 6.35 mm (0.250 inch) or the thickness required for a portable tank with a design pressure at least equal to 1.3 times the vapor pressure of the hazardous material at 46 °C (115 °F).

TP46 Portable tanks in sodium metal service are not required to be hydrostatically retested.

TP47 This hazardous material is not permitted for transport in IM portable tanks.

* * * * *

(8) * * *

Code/Special Provisions

W7 Vessel stowage category for uranyl nitrate hexahydrate solution is ''D'' as defined in § 172.101(k)(4).

W8 Vessel stowage category for pyrophoric thorium metal or pyrophoric uranium metal is ''D'' as defined in § 172.101(k)(4).

W9 When offered for transportation by water, the following Specification packagings are not authorized unless approved by the Associate Administrator: Woven plastic bags, plastic film bags, textile bags, paper bags, IBCs and bulk packagings.

* * * * *

13. In addition, in § 172.102, in paragraph (c)(3), Special Provisions B100, B101, B103, B104, B105, B106, B108, B109 and B110 would be removed.

14. In § 172.203, paragraph (d)(11) would be revised, new paragraphs (i)(5) and (i)(6) would be added, and paragraph (n) would be revised to read as follows:

§ 172.203 Additional description requirements.

* * * * *

(d) * * *

(11) For a shipment of low specific activity material or surface contaminated objects, the appropriate group notation of LSA–I, LSA–II, LSA–III, SCO–I, or SCO–II, unless these symbols are contained in the proper shipping name.

* * * * *

(i) * * *

(5) Minimum flashpoint if 61°C or below (in °C closed cup (c.c.).

(6) Subsidiary hazards not communicated in the proper shipping name.

* * * * *

(n) *Elevated temperature materials.* If a liquid material in a package meets the definition of an elevated temperature material in § 171.8 of this subchapter, and the fact that it is an elevated temperature material is not disclosed in the proper shipping name (for example, when the words ''Molten'' or ''Elevated temperature'' are part of the proper shipping name), the word ''HOT'' must immediately precede the proper shipping name of the material on the shipping paper.

* * * * *

15. In § 172.402, paragraph (b) would be revised to read as follows:

§ 172.402 Additional labeling requirements.

* * * * *

(b) *Display of hazard class on labels.* The appropriate hazard class or division number must be displayed in the lower corner of a primary hazard label and a subsidiary hazard label. A subsidiary label meeting the specifications of this section which were in effect on [Date of publication of final rule] (such as, a label without the hazard class or division number displayed in the lower corner of the label) may continue to be used as a subsidiary label in domestic transportation by rail or highway until October 1, 2005, provided the color tolerances are maintained and are in accordance with the display requirements in this subchapter.

* * * * *

§ 172.405 [Amended]

16. In § 172.405, the following changes would be made:

a. In paragraph (a) introductory text, the wording ''subsidiary label when—'' would be removed and ''subsidiary label.'' would be added in its place.

b. Paragraphs (a)(1) and (a)(2) would be removed.

17. In § 172.411, the section heading, the text of paragraph (c) preceding the labels, and paragraph (d) would be revised to read as follows:

§ 172.411 EXPLOSIVE 1.1, 1.2, 1.3, 1.4, 1.5 and 1.6 labels.

* * * * *

(c) Except for size and color, the EXPLOSIVE 1.4, EXPLOSIVE 1.5 and EXPLOSIVE 1.6 labels must be as follows:

* * * * *

(d) In addition to complying with § 172.407, the background color on the EXPLOSIVE 1.4, EXPLOSIVE 1.5, EXPLOSIVE 1.6 and EXPLOSIVE subsidiary label must be orange. The ''*'' shall be replaced with the appropriate compatibility group. The compatibility group letter must be shown as a capitalized Roman letter. Division numerals must measure at least 30 mm (1.2 inches) in height and at least 5 mm (0.2 inches) in width.

18. In addition, in § 172.411, in paragraph (c), the wording ''EXPLOSIVE SUBSIDIARY LABEL:'' and the label following it would be removed.

19. In § 172.504, in paragraph (g), a sentence would be added at the end of the existing text and paragraphs (g)(1) through (g)(4) would be added to read as follows:

§ 172.504 General placarding requirements.

* * * * *

(g) * * * When more than one compatibility group placard is required for Class 1 materials, only one placard is required to be displayed as follows:

(1) Explosive articles of compatibility groups C, D or E may be placarded displaying compatibility group E.

(2) Explosive articles of compatibility groups C, D, E or N may be placarded displaying compatibility group D.

(3) Explosive substances of compatibility groups C and D may be placarded displaying compatibility group D.

(4) Explosive articles of compatibility groups C, D, E or G, except for fireworks, may be placarded displaying compatibility group E.

20. In § 172.519, paragraph (b)(4) would be revised to read as follows:

§ 172.519 General specifications for placards.

* * * * *

(b) * * *

(4) For a placard corresponding to the primary or subsidiary hazard class of a material, the hazard class or division number must be displayed in the lower corner of the placard. A permanently affixed subsidiary placard meeting the specifications of this section which were in effect on [date of publication of final rule] (such as, a placard without the hazard class or division number displayed in the lower corner of the placard) and which was installed prior to October 1, 2001, may continue to be used as a subsidiary placard in domestic transportation by rail or highway, provided the color tolerances are maintained and are in accordance with the display requirements in this subchapter. Stocks of non-permanently affixed subsidiary placards in compliance with the requirements in effect on [date of publication of final rule], may continue to be used in domestic transportation by rail or highway until October 1, 2005, or until current stocks are depleted, whichever occurs first.

* * * * *

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

21. The authority citation for part 173 would continue to read as follows:

Authority: 49 U.S.C. 5101–5127, 44701; 49 CFR 1.53.

22. In § 173.2a, in paragraph (b), in the Precedence of Hazard Table, in the first column, the first three entries would be amended by adding a footnote reference ''[2]'' immediately following ''I'', ''II'', and ''III'', respectively, and in footnote 2 at the end of the table would be revised to read as follows:

§ 173.2a Classification of a material having more than one hazard.

* * * * *

(b) * * *

PRECEDENCE OF HAZARD TABLE

*	*	*	*	*	*	*

[2] Materials of Division 4.1 other than self-reactive substances and solid desensitized explosives, and materials of Class 3 other than liquid desensitized explosives.

* * * * *

23. In § 173.4, paragraph (a)(1) introductory text is revised to read as follows:

§ 173.4 Small quantity exceptions.

(a) * * *

(1) The maximum quantity of material per inner receptacle or article is limited to:

* * * * *

24. In § 173.24b, paragraph (e) would be added to read as follows:

§ 173.24b Additional general requirements for bulk packagings.

* * * * *

(e) *Specification packagings and UN standard packagings manufactured outside the United States*—(1) *UN portable tanks.* A UN portable tank manufactured in the United States must conform in all details to the applicable requirements in this part, the specification requirements in part 178 of this subchapter and the retest requirements in part 180 of this subchapter.

(2) *UN portable tanks manufactured outside the United States.* A UN portable tank manufactured outside the United States, in accordance with national or international regulations based on the UN Recommendations on the Transport of Dangerous Goods and is an authorized packaging, it may be filled, offered and transported in the United States, if the § 172.101 Table of this subchapter authorizes the hazardous material and it conforms to the applicable T code and tank provision codes assigned to the hazardous material in Column (7) of the Table. In addition, the portable tank must be in accordance with the following:

(i) Conform to applicable provisions in the UN Recommendations on the Transport of Dangerous Goods (Incorporated by reference, see § 171.7 of this subchapter) and the requirements of this subpart;

(ii) Be capable of passing the prescribed tests in part 178 of this subchapter applicable to the UN portable tank specification;

(iii) Be designed and manufactured according to the ASME Code (Incorporated by reference, see § 171.7 of this subchapter) or a pressure vessel design code approved by the Associate Administrator;

(iv) Be approved by the Associate Administrator when the portable tank is designed and constructed under the provisions of an alternative arrangement (see § 178.274(a)(2) of this subchapter); and

(v) When manufactured in a country other than the United States, the competent authority of the country of manufacture must provide reciprocal treatment for UN portable tanks manufactured in the United States.

25. Section 173.32 would be revised to read as follows:

§ 173.32 Requirements for the use of portable tanks.

(a) *General requirements.* No person may offer a hazardous material for transportation in a portable tank except as authorized by this subchapter.

(1) Except as otherwise provided in this subpart, a portable tank may not be used for the transportation of a hazardous material unless it meets the requirements of this subchapter.

(2) No person may fill and offer for transportation a portable tank when the prescribed periodic test or inspection under subpart G of part 180 of this subchapter has become due until the test or inspection has been successfully completed. This requirement does not apply to any portable tank filled prior to the test or inspection due date.

(3) When a portable tank is used as a cargo tank container, it shall conform to all the requirements prescribed for cargo tank containers. (See § 173.33.)

(b) *Substitute packagings.* A particular Specification portable tank may be substituted for another portable tank as follows:

(1) An IM or UN portable tank may be used whenever an IM or UN portable tank having less stringent requirements is authorized provided the portable tank meets or exceeds the requirements for pressure-relief devices, bottom outlets and any other special provisions specified in § 172.102(c)(7)(vi) of this subchapter.

(2) Where a Specification IM101 or IM102 portable tank is prescribed, a Specification 51 portable tank otherwise conforming to the special commodity requirements of § 172.102(c)(7) of this subchapter may be used.

(3) A DOT Specification 51 portable tank may be used whenever a DOT Specification 56, 57, or 60 portable tank is authorized. A DOT Specification 60 portable tank may be used whenever a DOT Specification 56 or 57 portable tank is authorized. A higher integrity tank used instead of a specified portable tank must meet the same design profile; for example, a DOT Specification 51 portable tank must be lined if used instead of a lined DOT Specification 60 portable tank.

(c) *Grandfather provisions for portable tanks*—(1) *Continued use of specification 56 and 57 portable tanks.* Continued use of an existing portable tank constructed to DOT Specification 56 or 57 is authorized only for a tank constructed before October 1, 1996. A stainless steel portable tank internally lined with polyethylene that was constructed on or before October 1, 1996, and that meets all requirements of DOT Specification 57 except for being equipped with a polypropylene discharge ball valve and polypropylene secondary discharge opening closure, may be marked as a Specification 57 portable tank and used in accordance with the provisions of this section.

(2) A DOT Specification 51 and IM 101 or IM 102 portable tank may not be manufactured after January 1, 2003 may continue to be used for the transportation of a hazardous material provided they fulfill the requirements of

this subchapter, including the specification requirements and the requirements of this subchapter for the transportation of the particular hazardous material (see § 171.14(d)(5) of this subchapter), and provided it conforms to the periodic inspection and tests specified for the particular portable tank in subpart G of part 180 of this subchapter. On and after January 1, 2003, all newly manufactured portable tanks must conform to the requirements for the design, construction and approval of UN portable tanks as specified in §§ 178.273, 178.274, 178.275, 178.276 and 178.277 of this subchapter.

(3) A DOT Specification portable tank manufactured prior to January 1, 1992 that is equipped with a non-reclosable pressure relief device may continue in service for the hazardous materials for which it is authorized. Except for a DOT Specification 56 or 57 portable tank, a DOT Specification portable tank manufactured after January 1, 1992, used for materials meeting the definition for Division 6.1 liquids, Packing Group I or II, Class 2 gases, or Class 3 or 4 liquids, must be equipped with a re-closing pressure relief valve having adequately sized venting capacity.

(d) *Maximum Allowable Working Pressure.* (1) Prior to filling and offering a portable tank for transportation, the shipper must confirm that the portable tank conforms to the specification required for the hazardous material and that the maximum allowable working pressure (MAWP) of the portable tank is greater than or equal to the highest pressure obtained under the following conditions:

(i) For compressed gases and certain refrigerated liquids that are not cryogenic liquids and that are not transported in a UN portable tank, the pressure prescribed in § 173.315. For liquefied compressed gases transported in a UN portable tank, the pressures prescribed in T50 in § 172.102 of this subchapter.

(ii) For liquid hazardous materials the pressures specified in § 178.275(a) of this subchapter used for determining the MAWP.

(iii) The maximum pressure used to load or unload the hazardous material.

(2) Unless otherwise specified, where a portable tank is authorized, the minimum tank design pressure is 172 kPa (25 psig) for any Packing Group I or Packing Group II liquid hazardous material that meets more than one hazard class definition.

(e) *External inspection prior to filling.* Each portable tank must be given a complete external inspection. Any unsafe condition must be corrected prior to its being offered for transportation. The external inspection shall include a visual inspection of:

(1) The shell, piping, valves and other appurtenances for corroded areas, dents, defects in welds and other defects such as missing, damaged, or leaking gaskets;

(2) All flanged connections or blank flanges for missing or loose nuts and bolts;

(3) All emergency devices for corrosion, distortion, or any damage or defect that could prevent their normal operation;

(4) All required markings on the tank for legibility; and

(5) Any device for tightening manhole covers to ensure such devices are operative and adequate to prevent leakage at the manhole cover.

(f) *Loading requirements.* (1) A hazardous material may not be loaded in a portable tank if the part of the tank or any of its appurtenances having contact with the material during transportation would be damaged, would cause a dangerous reaction with the material or would compromise the ability of the portable tank to retain the hazardous material.

(2) A hazardous material may not be loaded in a portable tank unless it has pressure relief devices providing total relieving capacity meeting the requirements of this subchapter.

(3) Except during a hydrostatic test, a portable tank may not be subjected to a pressure greater than its maximum allowable working pressure.

(4) A portable tank may not be loaded to a gross weight greater than the maximum allowable gross weight specified on its identification plate.

(5) Except for a non-flowable solid or a liquid with a viscosity of 2,680 centistokes (millimeters squared per second) or greater at 20°C (68 °F), a portable tank or compartment thereof having a volume greater than 7,500 L (1,980 gallons) may not be loaded to a filling density of more than 20% and less than 80% by volume. This filling restriction does not apply if a portable tank is divided by partitions or surge plates into compartments of not more than 7,500 L (1,980) capacity. Portable tanks must not be offered for transportation in an ullage condition liable to produce an unacceptable hydraulic force due to surge.

(6) The outage for a portable tank may not be less than 2% at a temperature of 50 °C (122 °F). For UN portable tanks, the applicable maximum filling limits apply as specified according to the assigned TP codes in Column (7) of the § 172.101 Table of this subchapter except when transported domestically.

(7) Each tell-tale indicator for the space between a frangible disc and a safety relief valve mounted in series must be checked after the tank is filled and prior to transportation to ensure that the frangible disc is leak free. Any leakage through the frangible disc must be corrected prior to offering the tank for transportation. The tell-tale device must be designed to prevent the loss of any hazardous material through the device itself while the tank is in transportation.

(8) During filling, the temperature of the hazardous materials shall not exceed the limits of the design temperature range of the portable tank.

(9) The maximum mass of liquefied compressed gas per liter (gallon) of shell capacity (kg/L or lbs./gal.) may not exceed the density of the liquefied compressed gas at 50 °C (122 °F). The portable tank must not be liquid full at 60 °C (140 °F).

(g) *Relief system.* Any DOT Specification portable tank manufactured prior to January 1, 1992 that is equipped with a non-reclosable pressure relief device may continue in service for the hazardous materials for which it it is authorized. Except for DOT Specification 56 and 57 portable tanks, any DOT Specification portable tank manufactured after January 1, 1992 used for materials meeting the definition for Division 6.1 liquids Packing Group I or II, Class 2 gases, or Class 3 or 4 liquids must be equipped with a reclosing pressure relief valve having adequately sized venting capacity.

(h) *Additional requirements for specific modal transport.* In addition to other applicable requirements, the following apply:

(1) A portable tank containing a hazardous material may not be loaded on a highway or rail transport vehicle unless loaded entirely within the horizontal outline thereof, without overhang or projection of any part of the tank assembly. In addition, for unloading a portable tank, see § 177.834(h) of this subchapter.

(2) A portable tank used for the transportation of flammable liquids by rail may not be fitted with non-reclosing pressure relief devices except in series with reclosing pressure relief valves.

(3) A portable tank or Specification 106A or 110A multi-unit tank car containing a hazardous material may not be offered for transportation aboard a passenger vessel unless:

(i) The vessel is operating under a change to its character of vessel certification as defined in § 171.8 of this subchapter; and

(ii) The material is permitted to be transported aboard a passenger vessel in the § 172.101 Table of this subchapter.

(i) *Additional general commodity specific requirements.* In addition to other applicable requirements, the following requirements apply:

(1) Each uninsulated portable tank used for the transportation of liquefied compressed gases must have an exterior surface finish that is significantly reflective, such as a light-reflecting color if painted, or a bright reflective metal or other material if unpainted.

(2) If a hazardous material is being transported in a molten state, the portable tank must be thermally insulated with suitable insulation material of sufficient thickness that the overall thermal conductance is not more than 0.080 Btu per hour per square foot per degree Fahrenheit differential.

(j) *Additional requirements for portable tanks other than IM specification and UN portable tanks.* (1) The bursting strength of any piping and fittings must be at least four times the design pressure of the tank, and at least four times the pressure to which, in any instance, it may be subjected in service by the action of a pump or other device (not including safety relief valves) that may subject piping to pressures greater than the design pressure of the tank.

(2) Pipe joints must be threaded, welded or flanged. If threaded pipe is used, the pipe and pipe fittings must not be lighter than (Schedule 80) weight. Non-malleable metals must not be used in the construction of valves or fittings. Where copper tubing is permitted, joints must be brazed or be of equally strong metal union type. The melting point of brazing material may not be lower than 1,000 °F (537.8°C). The method of joining tubing must not decrease the strength of the tubing such as by the cutting of threads.

(3) Non-malleable metals may not be used in the construction of valves or fittings.

(4) Suitable provision must be made in every case to allow for expansion, contraction, jarring and vibration of all pipe. Slip joints may not be used for this purpose.

(5) Piping and fittings must be grouped in the smallest practicable space and must be protected from damage as required by the specification.

(6) All piping, valves and fittings on every portable tank must be leakage tested with gas or air after installation and proved tight at not less than the design pressure of the portable tank on which they are used. In the event of replacement, all such piping, valves, or fittings so replaced must be tested in accordance with the requirements of this section before the portable tank is returned to transportation service. The requirements of this section apply to all hoses used on portable tanks, except that hoses may be tested either before or after installation on the portable tank.

(7) All materials used in the construction of portable tanks and their appurtenances may not be subject to destructive attack by the contents of the tank.

(8) All parts of the portable tanks and appurtenances for anhydrous ammonia must be steel. No aluminum, copper, silver, zinc, nor their alloys may be used. Brazed joints may not be used.

(9) Each outlet of a portable tank used for the transportation of liquefied compressed gases, except carbon dioxide, must be provided with a suitable automatic excess-flow valve (see definition in § 178.337–1(g) of this subchapter). These valves must be located inside the portable tank or at a point outside the portable tank where the line enters or leaves the portable tank. The valve seat must be located inside the portable tank or may be located within a welded flange or its companion flange, or within a nozzle or within a coupling. The installation must be made in such a manner as to reasonably assure that any undue strain which causes failure requiring functioning of the valve shall cause failure in such a manner that it will not impair the operation of the valve.

(i) Safety device connections and liquid level gauging devices that are constructed so that the outward flow of tank contents willl not exceed that passed by an opening of 0.1397 cm (0.0550 inches) are not required to be equipped with excess-flow valves.

(ii) An excess-flow valve must close automatically if the flow reaches the rated flow of gas or liquid specified by the original valve manufacturer when piping mounted directly on the valve is sheared off before the first valve, pump, or fitting downstream from the excess flow valve.

(iii) An excess-flow valve may be designed with a by-pass, not to exceed a 0.1016 cm (0.040 inches) diameter opening to allow equalization of pressure.

(iv) Filling and discharge lines must be provided with manually operated shut-off valves located as close to the tank as practical. The use of ''Stop-Check'' valves to satisfy with one valve the requirements of this section is forbidden.

(10) Each portable tank used for carbon dioxide and nitrous oxide must be lagged with a suitable insulation material of such thickness that the overall thermal conductance is not more than 0.08 Btu per square foot per degree Fahrenheit differential in temperature per hour. The conductance must be determined at 60° Fahrenheit. Insulation material used on portable tanks for nitrous oxide must be noncombustible.

(11) A refrigerating and/or heating coil or coils must be installed in portable tanks used for carbon dioxide and nitrous oxide. Such coils must be tested externally to at least the same pressure as the test pressure of the portable tank. The coils must also be tested internally to at least twice the working pressure of the heating or refrigerating system to be used, but in no case less than the test pressure of the portable tank. Such coils must be securely anchored. The refrigerant or heating medium to be circulated through the coil or coils must be such as to cause no adverse chemical reaction with the portable tank or its contents in the event of leakage.

§ 173.32a [Removed]

26. § 173.32a would be removed.

§ 173.32b [Removed]

27. § 173.32b would be removed.

§ 173.32c [Removed]

28. § 173.32c would be removed.

29. In § 173.61, paragraph (e)(3) would be revised and a new paragraph (e)(8) would be added to read as follows:

§ 173.61 Mixed packaging requirements.

* * * * *

(e) * * *

(3) Explosives of compatibility group S may be packaged together with explosives of all other compatibility groups except A and L, and the entire package shall be treated as belonging to any of the packaged compatibility groups except S.

* * * * *

(8) Explosive articles of compatibility groups C, D, E and G, except for fireworks and articles requiring special packaging, may be packaged together and the entire package shall be treated as belonging to compatibility group E.

§ 173.62 [Amended]

30. In § 173.62, in paragraph (c), in the Explosives Packing Instructions Table, in the fourth column, the following changes would be made in appropriate packaging specification number order:

a. For packing instruction entries, 112(a), 112(b), 112(c), 113, 115, 116, 130, 131, 134, 135, 136, 138, 140, 141, 142 and 144, under the word ''Drums'', the wording ''plywood (1D)'' would be added in the alpha-numeric order of the parenthetical.

b. For the packing instruction entries, 112(c), 113, 115, 134, 138 and 140, under the word ''Drums'', the wording ''plastics, removable head (1H2)'' would be added in the alpha-numeric order of the parenthetical.

c. For the packing instruction entries, 134 and 138, under the word ''Drums'', the wording ''fiberboard (1G)'' would be added in the alpha-numeric order of the parenthetical.

d. For the packing instruction entry, 144, under the wording ''plastics, expanded (4H1)'', the word ''Drums.'' would be added and under the new word ''Drums.'', the wording, ''steel, removable head (1A2)'', ''Aluminum, removable head (1B2)'' and ''plastics, removable head (1H2)'' would be added in the alpha-numeric order of the parenthetical.

e. For the packing instruction entry, 144, under the word ''Boxes'', the wording ''plastics, solid (4H2)'' would be added in the alpha-numeric order of the parenthetical.

f. For the packing instruction entries, 112(c) and 113, under the word ''Boxes'', the wording ''aluminum (4B)'' would be added in the alpha-numeric order of the parenthetical.

31. In § 173.128, paragraph (d)(1)(ii) would be revised to read as follows:

§ 173.128 Class 5, Division 5.2—Definitions and types.

* * * * *

(a) * * *

(1) * * *

(ii) A mixture of organic peroxides prepared according to § 173.225(c)(3); or

* * * * *

32. In § 173.150, paragraph (d)(2) is revised to read as follows:

§ 173.150 Exceptions for Class 3 (flammable) and combustible liquids.

* * * * *

(d) * * *

(2) Is in an inner packaging of five liters (1.3 gallons) or less, and is not transported as checked or carry-on baggage by passenger aircraft, except as provided in § 175.10(a)(17) of this subchapter; or

* * * * *

33. In § 173.162, paragraph (a) introductory text and (a)(1) would be revised to read as follows:

§ 173.162 Gallium.

(a) Except when packaged in cylinders or steel flasks, gallium must be packaged in packagings which meet the requirements of part 178 of this subchapter at the Packing Group I performance level for transportation by aircraft, and at the Packing Group III performance level for transport by highway, rail or vessel, as follows:

(1) In combination packagings intended to contain liquids consisting of glass, earthenware or rigid plastic inner packagings with a maximum net mass of 15 kg (33 pounds) each. The inner packagings must be packed in wood boxes (4C1, 4C2, 4D, 4F), fiberboard boxes (4G), plastic boxes (4H1, 4H2), fiber drums (1G) or removable head steel and plastic drums or jerricans (1A2, 1H2, 3A2 or 3H2) with sufficient cushioning materials to prevent breakage. Either the inner packagings or the outer packagings must have inner liners or bags of strong leakproof and puncture-resistant material impervious to the contents and completely surrounding the contents to prevent it from escaping from the package, irrespective of its position.

* * * * *

34. In § 173.185, a new sentence would be added at the end of paragraph (a), paragraphs (b) introductory text, (b)(1), (b)(2), (b)(5), (c)(1), (c)(2), and (c)(3) would be revised, and a heading would be added to paragraph (c) to read as follows:

§ 173.185 Lithium batteries and cells.

(a) * * * For the purposes of this subchapter, ''lithium content'' means the mass of lithium in the anode of a lithium metal or lithium alloy cell, except in the case of a lithium ion cell where the ''equivalent lithium content'' in grams is calculated to be 0.3 times the rated capacity in ampere-hours.

(b) *Exceptions.* Cells and batteries are not subject to the requirements of this subchapter if they meet the following requirements:

(1) Each cell with a liquid cathode may contain no more than 0.5 g of lithium content. Each cell with a solid cathode may contain no more than 1.0 g lithium content. Each lithium ion cell may contain no more than 1.5 g of equivalent lithium content;

(2) Each battery with a liquid cathode may contain an aggregate quantity of no more than 1.0 g lithium content. Each battery with a solid cathode may contain an aggregate quantity of no more than 2.0 g of lithium content. Each lithium-ion battery may contain an aggregate quantity of no more than 8.0 grams of equivalent lithium content;

* * * * *

(5) If when fully charged, the aggregate lithium content of the anodes in a liquid cathode battery is more than 0.5 g, or the aggregate lithium content of the anodes in a solid cathode battery is more than 1.0 g, then the battery may not contain a liquid or gas that is a hazardous material according to this subchapter unless the liquid or gas, if free, would be completely absorbed or neutralized by other materials in the battery.

(c) *Additional exceptions.* * * *

(1) The lithium content of the anode of each cell, when fully charged, is not more than 5 g;

(2) The aggregate lithium content of the anodes of each battery, when fully charged, is not more than 25 g;

(3) Each cell or battery is of the type proven to be non-dangerous by testing in accordance with tests in the UN Manual of Tests and Criteria (incorporated by reference, see § 171.7 of this subchapter). Such testing must be carried out on each type of cell or battery prior to the initial transport of that type; and

* * * * *

35. In § 173.224, paragraph (b)(4) would be revised; in the table following paragraph (b)(7), the following entry would be added in the appropriate alphabetical order; and paragraph (d) would be removed, to read as follows:

§ 173.224 Packaging and control and emergency temperatures for self-reactive materials.

* * * * *

(b) * * *

(4) *Packing method.* Column 4 specifies the highest packing method which is authorized for the self-reactive material. A packing method corresponding to a smaller package size may be used, but a packing method corresponding to a larger package size may not be used. The Table of Packing Methods in § 173.225(d) defines the packing methods. Bulk packagings are authorized as specified in § 173.225(d) for Type F self-reactive substances. Additional bulk packagings are authorized if approved by the Associate Administrator.

* * * * *

(7) * * *

SELF-REACTIVE SUBSTANCES

Self-reactive substance	Identification No.	Concentration—(%)	Packing method	Control temperature—(°C)	Emergency temperature	Notes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
* * *		*	*	*		*
2,2′-Azodi(isobutyronitrile) as a water based paste	3224	≤50%	OP6	.....	.....	.....
* * *		*	*	*		*

* * * * *

36. In § 173.225, in paragraph (b), in the Organic Peroxide Table, the following entries would be removed and added in the appropriate alphabetical order; in Column (8), ''7'' and ''10'' would be removed each place they appear; and in the ''NOTES'' immediately following the Table, Notes ''7'' and ''10'' would be removed and reserved and Notes ''26'' and ''27'' would be added in the appropriate numerical order; and paragraphs (e) introductory text, (e)(3), and (e)(5) would be revised to read as follows:

§ 173.225 Packaging requirements and other provisions for organic peroxides.

* * * * *

(b) * * *

ORGANIC PEROXIDE TABLE

Technical name	ID number	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Note
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
* * *		*		*			*		*	
[REMOVE:]										
tert-Amyl peroxybenzoate	UN3105	≤96	≥4	.....	.....	.....	OP7	.....	.....	.....
* * *		*		*			*		*	
tert-Butyl peroxy-2-ethylhexanoate	UN3119	≤32	.....	≥68	.....	.....	Bulk	10	15	14
* * *		*		*			*		*	
tert-Butyl peroxyneodecanoate [as a stable dispersion in water].	UN3117	≤42	.....	.....	.....	.....	OP8	0	10	
* * *		*		*			*		*	
tert-Butyl peroxyneoheptanoate	UN3115	≤77	≥23	.....	.....	.....	OP7	10	15	
* * *		*		*			*		*	
tert-Butyl peroxypivalate	UN3119	≤27	.....	≥73	.....	.....	Bulk	−5	5	14
* * *		*		*			*		*	
Cumyl peroxyneoheptanoate	UN3115	≤77	≥23	.....	.....	.....	OP7	0	10	
* * *		*		*			*		*	
Cyclohexanone peroxide(s)	UN3105	≤72	.....	≥28	.....	.....	OP7	.....	.....	5
* * *		*		*			*		*	
1,1-Di-(tert-butylperoxy)-3,5,5- trimethylcyclohexane	UN3101	>90–100	.....	.....	.....	.....	OP5			
1,1-Di-(tert-butylperoxy)-3,5,5- trimethylcyclohexane	UN3103	>57–90	≥10	.....	.....	.....	OP5			
1,1-Di-(tert-butylperoxy)-3,5,5-trimethylcyclohexane	UN3106	≤57	.....	.....	≥43	.....	OP7.			
1,1-Di-(tert-butylperoxy)-3,5,5-trimethylcyclohexane	UN3107	≤57	≥43	.....	.....	.....	OP8			
1,1-Di-(tert-butylperoxy)-3,5,5-trimethylcyclohexane	UN3107	≤32	≥26	≥42	.....	.....	OP8			
* * *		*		*			*		*	
Di-(2-ethylhexyl) peroxydicarbonate	UN3115	≤77	.....	≥23	.....	.....	OP7	−15	−5	
* * *		*		*			*		*	
Diisopropyl peroxydicarbonate	UN3115	≤52	.....	≥48	.....	.....	OP7	−10	0	
* * *		*		*			*		*	
2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy)hexane	UN3115	≤100	.....	.....	.....	.....	OP7	20	25	.....
* * *		*		*			*		*	
Dimyristyl peroxydicarbonate [as a stable dispersion in water].	UN3119	≤42	.....	.....	.....	.....	IBC	15	25	10
* * *		*		*			*		* –	
Di-n-propyl peroxydicarbonate	UN3113	≤100	.....	.....	.....	.....	OP4	−25	−15	.....
* * *		*		*			*		*	
Di-(3,5,5-trimethylhexanoyl) peroxide	UN3119	≤38	≥62	.....	.....	.....	Bulk	−10	0	14
* * *		*		*			*		*	
Isopropyl sec-butyl peroxydicarbonate [and] Di-sec-butyl peroxy-dicarbonate [and] Di-isopropyl peroxydicarbonate.	UN3115	≤32 +≤15–18 +≤12–15	≥38	.....	.....	.....	OP7	−20	−10	.....
* * *		*		*			*		*	
2,4,4-Trimethylpentyl-2-peroxyneodecanoate	UN3115	≤72	.....	≥28	.....	.....	OP7	−5	5	.....
2,4,4-Trimethylpentyl-2-peroxyneodecanoate [as a stable dispersion in water]..	UN3119	≤52	.....	.....	.....	.....	OP8	−5	5	
2,4,4-Trimethylpentyl-2-peroxy phenoxyacetate	UN3115	≤37	.....	≥63	.....	.....	OP7	−10	0	

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID number	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Note
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
[ADD:]										
tert-Amyl peroxybenzoate	UN3103	≤100					OP5			
* * *	*	*		*			*		*	
tert-Butyl peroxy-2-ethylhexanoate	UN3119	≤32		≥68			Bulk	15	20	14
* * *	*	*		*			*		*	
tert-Butyl peroxyneodecanoate [as a stable dispersion in water].	UN3117	≤52					OP8	0	10	
* * *	*	*		*			*		*	
tert-Butyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤42					IBC	−5	5	10
* * *	*	*		*			*		*	
tert-Butyl peroxyneodecanoate	UN3119	≤32	≥68				IBC	0	10	10
* * *	*	*		*			*		*	
tert-Butyl peroxyneoheptanoate	UN3115	≤77	≥23				OP7	0	10	
* * *	*	*		*			*		*	
tert-Butyl peroxypivalate	UN3119	≤27		≥73			Bulk	5	10	14
* * *	*	*		*			*		*	
Cumyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤52					IBC	−15	−5	
* * *	*	*		*			*		*	
Cumyl peroxyneoheptanoate	UN3115	≤77	≥23				OP7	−10	0	
* * *	*	*		*			*		*	
Cyclohexanone peroxide(s)	UN3105	≤72	≥28				OP7			5
* * *	*	*		*			*		*	
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	UN3101	>90–100					OP5			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	UN3103	>57–90	≥10				OP5			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	UN3105	≤77		≥23			OP7			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	UN3106	≤57			≥43		OP7			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	UN3107	≤57	≥43				OP8			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane	UN3107	≤32	≥26	≥42			OP8			
* * *	*	*		*			*		*	
2,2-Di-(4,4-di-(tert-butylperoxy cyclohexyl) propane	UN3107	≤ 22		≥78			OP8			
* * *	*	*		*			*		*	
Di-(2-ethylhexyl) peroydicarbonate [as a stable dispersion in water].	UN3119	≤52					IBC	−20	−10	
* * *	*	*		*			*		*	
Di-(2-ethoxyethyl) peroxydicarbonate	UN3115	≤52		≥48			OP7	−10	0	
* * *	*	*		*			*		*	
Di-(2-ethylhexyl) peroxydicarbonate	UN3115	≤77	≥23				OP7	−15	−5	
* * *	*	*		*			*		*	
Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water].	UN3117	≤ 62					OP8	−15	−5	
* * *	*	*		*			*		*	
Diisopropyl peroxydicarbonate	UN3115	≤52		≥48			OP7	−20	−10	
* * *	*	*		*			*		*	
Di-(3-methoxybutyl) peroxydicarbonate	UN3115	≤ 52		≥48			OP7	−5	5	
* * *	*	*		*			*		*	
Di-(3-methylbenzoyl) peroxide+Benzoyl (3-methylbenzoyl) peroxide+Dibenzoyl peroxide.	UN3115	≤ 20+ ≤18+ ≤4		≥58			OP7	35	40	
* * *	*	*		*			*		*	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	UN3108	≤77			≥23		OP8			
* * *	*	*		*			*		*	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3	UN3101	>86–100					OP5			
* * *	*	*		*			*		*	
Dimyristyl peroxydicarbonate [as a stable dispersion in water].	UN3119	≤42					IBC	15	20	10
* * *	*	*		*			*		*	
Di-n-propyl peroxydicarbonate	UN3113	≤100					OP3	−25	−15	
* * *	*	*		*			*		*	
Di-n-propyl peroxydicarbonate	UN3113	≤77		≥23			OP5	−20	−10	
* * *	*	*		*			*		*	
tert-Hexyl peroxyneodecanoate	UN3115	≤71	≥29				OP7	0	10	
* * *	*	*		*			*		*	
tert-Hexyl peroxypivalate	UN3115	≤72		≥28			OP7	10	15	
* * *	*	*		*			*		*	
Methyl ethyl ketone peroxide(s)	UN3105	≤37	≥55			≥8	OP7 26			

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID number	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Note
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
* * *		*		*			*		*	
1,1,3,3-Tetramethylbutyl peroxyneodecanoate	UN3115	≤72		≥28			OP7	−5	5	
1,1,3,3-Tetramethylbutyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤52					IBC −5	−5	−10	
1,1,3,3-Tetramethylbutyl peroxy phenoxyacetate	UN3115	≤37		≥63			OP7	−10	0	
* * *		*		*			*		*	
3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane	UN3105	≤42	≥58				OP7			27
* * *		*		*			*		*	

Notes:

* * * * *

26. Available oxygen must be ≤ 10%.

27. Available oxygen must be ≤ 7.6%.

* * * * *

(e) *Bulk packagings for organic peroxides.* The following bulk packagings are authorized:

* * * * *

(3) *Portable tanks.* The following requirements apply to portable tanks intended for the transport of Type F organic peroxides or Type F self-reactive substances. DOT 51, 57, IM 101 portable tanks, and UN portable tanks that conform to the requirements of T23 (see § 172.102(c)(7) of this subchapter), when T23 is specified in Column (7) of the § 171.101 Table of this subchapter for the Type F organic peroxide or Type F self-reactive substance. Type F organic peroxide or self-reactive substance formulations other than those indicated in T23 may be transported in portable tanks if approved by the Associate Administrator. The following conditions also apply:

(i) The portable tank must be designed for a test pressure of at least 0.4 MPa (4 bar).

(ii) Portable tanks must be fitted with temperature-sensing devices.

(iii) Portable tanks must be fitted with pressure relief devices and emergency-relief devices. Vacuum-relief devices may also be used. Pressure relief devices must operate at pressures determined according to both the properties of the hazardous material and the construction characteristics of the portable tank. Fusible elements are not allowed in the shell.

(iv) The pressure relief devices must consist of reclosing devices fitted to prevent significant build-up within the portable tank of the decomposition products and vapors released at a temperature of 50 °C (122 °F). The capacity and start-to-discharge pressure of the relief devices must be in accordance with the applicable requirements of this subchapter specified for the portable tank. The start-to-discharge pressure must in no case be such that liquid would escape from the pressure relief devices if the portable tank were overturned.

(v)(A) The emergency-relief devices may be of the reclosing or frangible types, or a combination of the two, designed to vent all the decomposition products and vapors evolved during a period of not less than one hour of complete fire engulfment as calculated by the following formula:

$$q = 70961\ F\ A^{0.82}$$

Where:

q = heat absorption (W)

A = wetted area (m^2)

(B) Insulation factor (F) in the formula in paragraph (e)(3)(v)(A) of this section equals 1 for non-insulated vessels and for insulated vessels F is calculated using the following formula:

$$F = \frac{U\left(923 - T_{PO}\right)}{47032}$$

Where:

U = K/L = heat transfer coefficient of the insulation ($W \cdot m^{-2} \cdot K^{-1}$); where K = heat conductivity of insulation layer ($W \cdot m^{-1} \cdot K^{-1}$), and L = thickness of insulation layer (m).

T_{PO} = temperature of material at relieving conditions (K).

(vi) The start-to-discharge pressure of emergency-relief devices must be higher than that specified for the pressure relief devices in paragraph (e)(3)(iv) of this section. The emergency-relief devices must be sized and designed in such a way that the maximum pressure in the shell never exceeds the test pressure of the portable tank.

Note to Paragraph (e)(3)(vi): An example of a method to determine the size of emergency-relief devices is given in Appendix 5 of the UN Manual of Tests and Criteria (incorporated by reference, see § 171.7 of this subchapter).

(vii) For insulated portable tanks, the capacity and setting of emergency-relief devices must be determined assuming a loss of insulation from 1 percent of the surface area.

(ix) Vacuum-relief devices and reclosing devices on portable tanks used for flammable hazardous materials must be provided with flame arresters. Any reduction of the relief capacity caused by the flame arrester must be taken into account and the appropriate relief capacity must be provided.

(x) Service equipment such as devices and external piping must be designed and constructed so that no hazardous material remains in them after filling the portable tank.

(xi) Portable tanks may be either insulated or protected by a sun-shield. If the SADT of the hazardous material in the portable tank is 55 °C (131 °F) or less, the portable tank must be completely insulated. The outer surface must be finished in white or bright metal.

(xii) The degree of filling must not exceed 90% at 15 °C (59 °F).

(xiii) DOT 57 metal portable tanks are authorized only for tert-butyl cumyl peroxide, di-(2-tert-butylperoxyisopropyl-benzene(s), dicumyl peroxide and mixtures of two or more of these peroxides.

* * * * *

(5) *IBCs.* IBCs are authorized subject to the conditions and limitations of this section provided the IBC type is authorized according to IB52 (see 172.102(c)(4) of this subchapter), as applicable, and the IBC conforms to the requirements in part 178 of this subchapter at the Packing Group II performance level. The following additional requirements also apply:

(i) IBCs shall be provided with a device to allow venting during transportation. The inlet to the pressure

relief device shall be sited in the vapor space of the IBC under maximum filling conditions during transportation.

(ii) To prevent explosive rupture of metal IBCs or composite IBCs with complete metal casing, the emergency-relief devices shall be designed to vent all the decomposition products and vapors evolved during self-accelerating decomposition or during a period of not less than one hour of complete fire-engulfment as calculated by the formula in paragraph (e)(3)(v) of this section. The control and emergency temperatures specified in IB52 are based on a non-insulated IBC.

37. In § 173.240, paragraphs (c) and (d) would be revised to read as follows:

§ 173.240 Bulk packagings for certain low hazard solid materials.

* * * * *

(c) *Portable tanks and closed bulk bins.* DOT 51, 56, 57 and 60 portable tanks; IMO type 1, 2 and 5, and IM 101 and IM 102 portable tanks; UN portable tanks; marine portable tanks conforming to 46 CFR part 64; and sift-proof non-DOT Specification portable tanks and closed bulk bins are authorized.

(d) *IBCs.* IBCs are authorized subject to the conditions and limitations of this section provided the IBC type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the IBC conforms to the requirements in part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table of this subchapter for the material being transported.

(1) IBCs may not be used for the following hazardous materials:

(i) Packing Group I liquids; and

(ii) Packing Group I solids that may become liquid during transportation.

(2) The following IBCs may not be used for Packing Group II and III solids that may become liquid during transportation:

(i) Wooden: 11C, 11D and 11;

(ii) Fiberboard: 11G;

(iii) Flexible: 13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2; and

(iv) Composite: 11HZ2 and 21HZ2.

38. In § 173.241, paragraphs (c) and (d) would be revised to read as follows:

§ 173.241 Bulk packagings for certain low hazard liquid and solid materials.

* * * * *

(c) *Portable tanks.* DOT Specification 51, 56, 57 and 60 portable tanks; IMO type 1, 2 and 5, and IM 101 and IM 102 portable tanks; UN portable tanks; marine portable tanks conforming to 46 CFR part 64; and non-DOT Specification portable tanks suitable for transport of liquids are authorized.

(d) *IBCs.* IBCs are authorized subject to the conditions and limitations of this section provided the IBC type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the IBC conforms to the requirements in part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table for the material being transported.

(1) IBCs may not be used for the following hazardous materials:

(i) Packing Group I liquids; and

(ii) Packing Group I solids that may become liquid during transportation.

(2) The following IBCs may not be used for Packing Group II and III solids that may become liquid during transportation:

(i) Wooden: 11C, 11D and 11F;

(ii) Fiberboard: 11G;

(iii) Flexible: 13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2; and

(iv) Composite: 11HZ2 and 21HZ2.

39. In § 173.242, paragraphs (c) introductory text and (d) would be revised to read as follows:

§ 173.242 Bulk packagings for certain medium hazard liquids and solids, including solids with dual hazards.

* * * * *

(c) *Portable tanks.* DOT Specification 51, 56, 57 and 60 portable tanks; Specification IM and UN portable tanks when a T Code is specified in Column (7) of the § 172.101 Hazardous Materials Table for a specific hazardous material; and marine portable tanks conforming to 46 CFR part 64 are authorized. DOT Specification 57 portable tanks used for the transport by vessel of Class 3, Packaging Group II materials must conform to the following:

* * * * *

(d) *IBCs.* IBCs are authorized subject to the conditions and limitations of this section provided the IBC type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the IBC conforms to the requirements in part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table of this subchapter for the material being transported.

(1) IBCs may not be used for the following hazardous materials:

(i) Packing Group I liquids; and

(ii) Packing Group I solids that may become liquid during transportation.

(2) The following IBCs may not be used for Packing Group II and III solids that may become liquid during transportation:

(i) Wooden: 11C, 11D and 11F;

(ii) Fiberboard: 11G;

(iii) Flexible: 13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2; and

(iv) Composite: 11HZ2 and 21HZ2.

* * * * *

40. In § 173.243, paragraphs (c) and (d) would be revised to read as follows:

§ 173.243 Bulk packaging for certain high hazard liquids and dual hazard materials which pose a moderate hazard.

* * * * *

(c) *Portable tanks.* DOT Specification 51 and 60 portable tanks; UN portable tanks when a T code is specified in Column (7) of the § 172.101 Table of this subchapter for a specific hazardous material; and marine portable tanks conforming to 46 CFR part 64 with design pressure of at least 172.4 kPa (25 psig) are authorized.

(d) *IBCs.* IBCs are authorized subject to the conditions and limitations of this section provided the IBC type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the IBC conforms to the requirements in part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table of this subchapter for the material being transported.

(1) IBCs may not be used for the following hazardous materials:

(i) Packing Group I liquids; and

(ii) Packing Group I solids that may become liquid during transportation.

(2) The following IBCs may not be used for Packing Group II and III solids that may become liquid during transportation:

(i) Wooden: 11C, 11D and 11F;

(ii) Fiberboard: 11G;

(iii) Flexible: 13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 and 13M2, and

(iv) Composite: 11HZ2 and 21HZ2.

* * * * *

41. In § 173.247, paragraph (c) would be revised to read as follows:

§ 173.247 Bulk packaging for certain elevated temperature materials (Class 9) and certain flammable elevated temperature materials (Class 3).

* * * * *

(c) *Portable tanks.* DOT Specification 51, 56, 57 and 60 portable tanks; IM 101, 102 portable tanks; UN portable tanks; marine portable tanks conforming to 46 CFR part 64; metal IBCs and non-

specification portable tanks equivalent in structural design and accident damage resistance to specification packagings are authorized.

* * * * *

42. In § 173.306, paragraph (a)(4)(iii) would be revised to read as follows:

§ 173.306 Limited quantities of compressed gases.

(a) * * *

(4) * * *

(iii) Non-pressurized gases, flammable must be packed in hermetically-sealed glass or metal inner packagings of not more than 5 L (1.3 gallons) overpacked in a strong outer packaging.

* * * * *

43. In § 173.315, the text of paragraph (a) preceding the table and paragraphs (i)(1)((iii), (i)(3), (i)(4) and (i)(8) would be revised and paragraph (i)(7) would be removed and reserved to read as follows:

§ 173.315 Compressed gases in cargo tanks and portable tanks.

(a) Liquefied compressed gases that are transported in UN portable tanks must be loaded and offered for transportation in accordance with tank provision T50 in § 172.102 of this subchapter. A liquefied compressed gas offered for transportation in a cargo tank motor vehicle or a portable tank must be prepared in accordance with this section, § 173.32, § 173.33 and subpart E or subpart G of part 180 of this subchapter; for cryogenic liquids, also see § 173.326 and § 173.328. Except for UN portable tanks, a liquefied compressed gas must be loaded and offered for transportation in accordance with the following table:

* * * * *

(i) * * *

(1) * * *

(iii) For an insulated tank, the required relieving capacity of the relief valves must be the same as for an uninsulated tank, unless the insulation will remain in place and will be effective under fire conditions. In this case, except for UN portable tanks, each insulated tank must be covered by a sheet metal jacket of not less than 16 gauge thickness. For UN portable tanks where the relieving capacity of the valves has been reduced on the basis of the insulation system, the insulation system must remain effective at all temperatures less than 649 °C (1200.2 °F) and be jacketed with a material having a melting point of 700 °C (1292.0 °F) or greater.

* * * * *

(3) Each safety relief valve on a portable tank, other than a UN portable tank, must be set to start-to-discharge at pressure no higher than 110% of the tank design pressure and no lower than the design pressure specified in paragraph (a) of this section for the gas transported. For UN portable tanks used for liquefied compressed gases and constructed in accordance with the requirements of § 178.276 of this subchapter, the pressure relief device(s) must conform to § 178.276(e) of this subchapter.

(4) Except for UN portable tanks, each safety relief valve must be plainly and permanently marked with the pressure in p.s.i.g. at which it is set to discharge, with the actual rate of discharge of the device in cubic feet per minute of the gas or of air at 60 °F (15.6 °C) and 14.7 p.s.i.a., and with the manufacturer's name or trade name and catalog number. The start-to-discharge valve must be visible after the valve is installed. The rated discharge capacity of the device must be determined at a pressure of 120% of the design pressure of the tank. For UN portable tanks, each pressure relief device must be clearly and permanently marked as specified in § 178.274(f)(1) of this subchapter.

* * * * *

(8) Each safety relief valve outlet must be provided with a protective device to prevent the entrance and accumulation of dirt and water. This device must not impede flow through the valve. Pressure relief devices must be designed to prevent the entry of foreign matter, the leakage of liquid and the development of any dangerous excess pressure.

* * * * *

PART 175—CARRIAGE BY AIRCRAFT

44. The authority citation for Part 175 would continue to read as follows:

Authority: 49 U.S.C. 5101–5127; 49 CFR 1.53.

45. In § 175.10, paragraphs (a)(10) and (a)(16) would be revised, and paragraph (a)(17) would be added to read as follows:

§ 175.10 Exceptions.

(a) * * *

(10) Safety matches or a lighter intended for use by an individual when carried on one's person. However, lighters containing unabsorbed liquid fuel (other than liquefied gas), lighter fuel, and lighter refills are not permitted on one's person or in checked or carry-on baggage.

* * * * *

(16) Perfumes and colognes, purchased through duty-free sales, carried by passengers or crew in carry-on baggage.

(17) Alcoholic beverages containing—

(i) Not more than 24% alcohol by volume; or

(ii) More than 24% and not more than 70% alcohol by volume when in retail packagings not exceeding 5 liters (1.3 gallons) carried by a crewmember or passenger in checked or carry-on baggage, with a total net quantity per person of 5 liters (1.3 gallons) for such beverages.

* * * * *

46. In § 175.33, paragraph (a) introductory text would be revised to read as follows:

§ 175.33 Notification of pilot-in-command.

(a) Except as provided in § 175.10, when a hazardous material subject to the provisions of this subchapter is carried in an aircraft, the operator of the aircraft must provide the pilot-in-command with accurate and legible written information as early as practicable before departure of the aircraft, which specifies at least the following:

* * * * *

47. Section 175.78 would be revised to read as follows:

§ 175.78 Stowage compatibility of cargo.

(a) For stowage on an aircraft, in a cargo facility, or in any other area at an airport designated for the stowage of hazardous materials, packages containing hazardous materials which might react dangerously with one another may not be placed next to each other or in a position that would allow a dangerous interaction in the event of leakage.

(b) As a minimum, the segregation instructions prescribed in the following Segregation Table must be followed to maintain acceptable segregation between packages containing hazardous materials with different hazards. The Segregation Table instructions in paragraph (c) of this section apply whether or not the class or division is the primary or subsidiary risk. The Segregation Table follows:

SEGREGATION TABLE

Hazard label	Class or division							
	1	2	3	4.2	4.3	5.1	5.2	8
1	Note 1	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2	Note 2
1	Note 2	.....	.....	.....	.....	.....	.....	.....
2	Note 2	.....	.....	.....	.....	.....	.....	.....
3	Note 2	.....	.....	.....	.....	X	.....	.....
4.2	Note 2	.....	.....	.....	.....	X	.....	.....
4.3	Note 2	.....	.....	.....	.....	X	.....	X
5.1	Note 2	.....	X	X	.....	.....	.....	.....
5.2	Note 2	.....	.....	.....	.....	.....	.....	.....
8	Note 2	.....	.....	.....	X	.....	.....	.....

(c) Instructions for using the Segregation Table are as follows:

(1) The dots at the intersection of a row and column indicate that no restrictions apply.

(2) The letter ''X'' at the intersection of a row and column indicates that packages containing these classes of hazardous materials may not be stowed next to or in contact with each other, or in a position which would allow interaction in the event of leakage of the contents.

(3) *Note 1.* ''Note 1'' at the intersection of a row and column means the following:

(i) For explosives in compatibility groups A through K and N—

(A) Packages bearing the same compatibility group letter and the same division number may be stowed together.

(B) Explosives of the same compatibility group, but different divisions may be stowed together provided the whole shipment is treated as belonging to the division having the smaller number. However, when explosives of Division 1.5 Compatibility Group D are stowed together with explosives of Division 1.2 Compatibility Group D, the whole shipment must be treated as Division 1.1, Compatibility Group D.

(C) Packages bearing different compatibility group letters may not be stowed , whether or not they belong to the same division, except as provided in paragraphs (c)(3)(ii) and (iii) of this section.

(ii) Explosives in Compatibility Group L may not be stowed with explosives in other compatibility groups. They may only be stowed with the same type of explosives in Compatibility Group L.

(iii) Explosives of Division 1.4, Compatibility Group S, may be stowed with explosives of all compatibility groups except for Compatibility Groups A and L.

(iv) Other than explosives of Division 1.4, Compatibility Group S (see paragraph (c)(3)(iii) of this section), and Compatibility Groups C, D and E that may be stowed together, explosives that do not belong in the same compatibility group may not be stowed together.

(A) Any combination of substances in Compatibility Groups C and D must be assigned to the most appropriate compatibility group shown in the § 172.101 Hazardous Materials Table.

(B) Explosives in Compatibility Group N may be stowed together with explosives in Compatibility Groups C, D and E when the combination is assigned Compatibility Group D.

(4) *Note 2.* ''Note 2'' at the intersection of a row and column means that other than explosives of Division 1.4, Compatibility Group S, explosives may not be stowed together with that class.

(5) Packages containing hazardous materials with multiple hazards in the class or divisions, which require segregation in accordance with the Segregation Table need not be segregated from other packages bearing the same UN number.

(6) A package labeled ''BLASTING AGENT'' may not be stowed next to or in a position that will allow contact with a package of special fireworks or railway torpedoes.

48. In § 175.85 paragraph (a) would be revised to read as follows:

§ 175.85 Cargo location.

(a) Except as provided in § 175.10, no person may carry a hazardous material subject to the requirements of this subchapter in the cabin of a passenger-carrying aircraft or on the flight deck of any aircraft. Hazardous materials may be carried in a main deck cargo compartment of a passenger aircraft provided that the compartment is inaccessible to passengers and that it meets all certification requirements for a Class B aircraft cargo compartment in 14 CFR 25.857(b) or for a Class C aircraft cargo compartment in 14 CFR 25.857(c).

* * * * *

PART 176—CARRIAGE BY VESSEL

49. The authority citation for part 176 would continue to read as follows:

Authority: 49 U.S.C. 5101–5127; 49 CFR 1.53.

50. In § 176.2, the following definition would be added in appropriate alphabetical order to read as follows:

§ 176.2 Definitions.

* * * * *

INF cargo means packaged irradiated nuclear fuel, plutonium or high-level radioactive wastes as those terms are defined in the ''International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships'' (incorporated by reference, see § 171.7 of this subchapter).

* * * * *

51. In § 176.63, a new paragraph (e) would be added to read as follows:

§ 176.63 Stowage locations.

* * * * *

(e) *Closed cargo transport unit,* for the purpose of stowage of Class 1 (explosive) materials on board a vessel, means a clean, substantial, weatherproof box structure which can be secured to the ship's structure and includes a closed freight container, a closed vehicle, a closed rail wagon or a portable magazine. When this stowage is specified, stowage in small compartments such as deckhouses and mast lockers or oversized weatherproof packages (overpacks) are acceptable alternatives. The floor of any closed cargo transport unit or compartment shall be constructed of wood, close boarded or arranged so that goods are stowed on sparred gratings, wooden pallets or dunnage. Provided that the necessary additional specifications are met, a closed cargo transport unit may be used for Class 1 (explosive) magazine stowage type ''A,'' ''B'' or ''C,'' but not as a portable magazine.

52. In § 176.84, in paragraph (b) Table of provisions, the entries ''4'' and ''5''

would be revised, paragraph (c)(1) would be revised, in paragraph (c)(2), the List of Notes would be revised and paragraph (c)(3) would be removed to read as follows:

§ 176.84 Other requirements for stowage and segregation for cargo vessels and passenger vessels.

* * * * *

(b) *Table of provisions:*

Code	Provisions
* * * * *	
4	Stow ''Separated from'' liquid organic materials.
5	Stow ''Separated from'' powdered metals and their compounds.

Code	Provisions
* * * * *	

(c) * * *

(1) Explosive substances and explosive articles must be stowed in accordance with Column (10A) and Columm (10B) of the § 172.101 Table of this subchapter.

Notes	Provisions
5E	Stow ''away from'' lead and its compounds.
7E	Stowage category ''04'' for projectiles or cartridges for guns, cannons or mortars; Stowage category ''08'' for other types.
8E	When under deck, special stowage is required.
14E	On deck, cargo transport unit must be steel.
15E	On deck, cargo transport unit must be leakproof.
17E	On deck stowage is recommended.
19E	Substances which contain ammonium nitrate or other ammonium salts must be stowed ''away from'' Explosive, blasting, type C, UN0083.
20E	Stowage category ''03'' for projectiles or cartridges for guns, cannons or mortars; Stowage category ''07'' for other types; magazines must be of steel construction that prevents leakage.
21E	Cargo space ventilation must be carefully controlled to avoid excessive condensation.
22E	May not be stowed together with explosive substances containing ammonium nitrate or other ammonium salts. Segregate from other Class 1 (explosive) materials in the same manner as is required for flammable liquids.
23E	Stowage category ''13'' and, for on deck stowage, non-metallic lining of closed cargo transport unit is required when not in effectively sealed, sift-proof packages; Stowage category ''10'' permitted when in effectively sealed, sift-proof packages.
26E	For closed cargo transport unit, a non-metallic lining is required.
27E	Stow away from alkaline compounds.

§ 176.128 [Amended]

53. In § 176.128, in paragraph (c), the word ''UN 0600'' would be revised to read ''UN 0060''.

§ 176.136 [Amended]

54. In § 176.136, in paragraph (e), the word ''portable'' would be removed.

55. In § 176.142, paragraph (a) would be revised to read as follows:

§ 176.142 Hazardous materials of extreme flammability.

(a) Except as allowed by paragraph (b) of this section, certain hazardous materials of extreme flammability may not be transported in a vessel carrying Class 1 (explosive) materials. This prohibition applies to the following liquid hazardous materials:

Carbon disulfide: UN1131, Class 3
Diethylzinc: UN1366, Division 4.2
Dimethylzinc: UN1370, Division 4.2
Magnesium alkyls: UN3053, Division 4.2
Methyl phosphorous dichloride: NA2845, Division 6.1
Nickel carbonyl: UN1259, Division 6.1
Pyrophoric liquid, inorganic, n.o.s.: UN3194, Division 4.2
Pyrophoric liquids, organic, n.o.s.: UN2845, Division 4.2
Pyrophoric organometallic compound, water-reactive, n.o.s.: UN3203, Division 4.2

* * * * *

56. A new section § 176.720 would be added to subpart M to read as follows:

§ 176.720 Requirements for carriage of INF cargo in international transportation.

(a) A vessel carrying INF cargo in international transportation must meet the requirements of the INF Code (incorporated by reference, see § 171.7 of this subchapter) in addition to all other applicable requirements of this subchapter.

PART 177—CARRIAGE BY PUBLIC HIGHWAY

57. The authority citation for part 177 would continue to read as follows:

Authority: 49 U.S.C. 5101–5127; 49 CFR 1.53.

58. In § 177.848, paragraph (g)(3)(vi) would be revised to read as follows:

§ 177.848 Segregation of hazardous materials.

* * * * *

(g) * * *

(3) * * *

(vi) ''6'' means explosive articles in compatibility group G, other than fireworks and those requiring special handling, may be loaded, transported and stored with articles of compatibility groups C, D and E, provided no explosive substances are carried in the same vehicle.

* * * * *

PART 178—SPECIFICATIONS FOR PACKAGINGS

59. The authority citation for part 178 would continue to read as follows:

Authority: 49 U.S.C. 5101–5127; 49 CFR 1.53.

60. A new section § 178.273 would be added to subpart H to read as follows:

§ 178.273 Approval of Specification IM portable tanks and UN portable tanks.

(a) *Application for approval.* (1) An owner or manufacturer of a portable tank shall apply for approval to a designated approval agency authorized to approve the portable tank in accordance with the procedures in subpart E, part 107 of this subchapter.

(2) Each application for approval must contain the following information:

(i) Three complete copies of all engineering drawings, calculations, and

test data necessary to ensure that the design meets the relevant specification.

(ii) The manufacturer's serial number that will be assigned to each portable tank.

(iii) A statement as to whether the design type has been examined by any approval agency previously and judged unacceptable. Affirmative statements must be documented with the name of the approval agency, reason for nonacceptance, and the nature of modifications made to the design type.

(b) *Action by approval agency.* The approval agency shall perform the following activities:

(1) Review the application for approval to determine whether it is complete and conforms with the requirements of paragraph (a) of this section. If an application is incomplete, it will be returned to the applicant and the applicant will be informed in what respects the application is incomplete.

(2) Review all drawings and calculations to ensure that the design is in compliance with all requirements of the relevant specification. If the application is approved, one set of the approved drawings, calculations, and test data shall be returned to the applicant. The second and third (inspector's copy) sets of approved drawings, calculations, and test data shall be retained by the approval agency. Maintain drawings and approval records for as long as the portable tank remains in service. The drawings and records must be provided to DOT upon request.

(3) Witness all tests required for the approval of the portable tank specified in § 178.273 and part 180, subpart G, of this subchapter.

(4) Ensure, through appropriate inspection that each portable tank is fabricated in all respects in conformance with the approved drawings, calculations, and test data.

(5) Determine and ensure that the portable tank is suitable for its intended use and that it conforms to the requirements of this subchapter.

(6) For UN portable tanks intended for liquefied compressed gases and Division 6.1 liquids which meet the inhalation toxicity criteria (Zone A or B) as defined in § 173.132 of this subchapter, or that are designated as toxic by inhalation materials in the § 172.101 Table of this subchapter, the approval agency must ensure that:

(i) The portable tank has been constructed in accordance with the ASME Code, Section VIII, Division 1 (incorporated by reference, see § 171.7 of this subchapter). ASME Code, Section VIII, Division II or other design code may be used if approved by the Associate Administrator (see § 178.274(b)(1));

(ii) All applicable provisions of the design and construction have been met to the satisfaction of the designated approval agency in accordance with the rules established in the ASME Code and that the portable tank meets the requirements of the ASME Code or other design code if approved by the Associate Administrator (see § 178.274(b)(1)), and all the applicable requirements specified in this subchapter;

(iii) The authorized inspector has carried out all the inspections specified by the rules established in the ASME Code; and

(iv) The portable tank is marked with a U stamp code symbol under the authority of an authorized independent inspector.

(7) For UN portable tanks the approval certificate must also include the following:

(i) The results of the applicable framework and rail impact test specified in part 180, subpart G, of this subchapter; and

(ii) The results of the initial inspection and test in § 180.605 of this subchapter.

(8) Upon successful completion of all requirements of this subpart, the approval agency shall:

(i) Apply its name, identifying mark or identifying number, and the date upon which the approval was issued, to the metal identification marking plate attached to the portable tank. Any approvals for UN portable tanks authorizing design or construction alternatives (Alternate Arrangements) approved by the Associate Administrator (see § 178.274(a)(2)) must be indicated on the plate as specified in § 178.274(i).

(ii) Issue an approval certificate for each portable tank or, in the case of a series of identical portable tanks manufactured to a single design type, for each series of portable tanks. The approval certificate must include all the information required to be displayed on the required metal identification plate required by § 178.270–14 for IM portable tanks, § 178.245–6 for specification 51 steel portable tanks, or § 178.274(i) for UN portable tanks. The approval certificate must attest that the approval agency designated to approve the portable tank has approved the portable tank in accordance with the procedures in subpart E, part 107 of this subchapter and that the portable tank is suitable for its intended purpose and meets the requirements of this subchapter. When a series of portable tanks is manufactured without change in the design type, the certificate may be valid for the entire series of portable tanks representing a single design type. For UN portable tanks, the certificate must refer to the prototype test report, the hazardous materials or group of hazardous materials allowed to be transported, the materials of construction of the shell and lining (when applicable) and an approval number. The approval number must consist of the distinguishing sign or mark of the country (''USA'' for the United States of America) where the approval was granted and a registration number.

(iii) Retain a copy of each approval certificate.

(9) The approval agency must remain independent from the manufacturer. The approval agency and the authorized inspector may be the same entity.

(c) *Manufacturers' responsibilities.* The manufacturer is responsible for compliance with the applicable specifications for the design and construction of portable tanks. In addition to responsibility for compliance, manufacturers are responsible for ensuring that the contracted approval agency and authorized inspector, if applicable, are qualified, reputable and competent. The manufacturer of a portable tank must:

(1) Comply with all the applicable requirements of the ASME Code (incorporated by reference, see § 171.7 of this subchapter) and of this subpart including, but not limited to, ensuring that the quality control, design calculations and required tests are performed and that all aspects of the portable tank meet the applicable requirements.

(2) Obtain and use a designated approval agency, if applicable, and obtain and use a DOT-designated approval agency to approve the design, construction and certification of the portable tank.

(3) Provide a statement in the manufacturers' data report attesting that each portable tank that is manufactured complies with the relevant specification and all the applicable requirements of this subchapter.

(4) Maintain records of the qualification of portable tanks for at least 5 years and provide copies to the approval agency and the owner of the tank. Provide records to the U.S. DOT upon request.

(d) *Denial of application for approval.* If an approval agency finds that a portable tank cannot be approved for any reason, it shall so notify the applicant in writing and shall provide the applicant with the reasons for which the approval is denied. A copy of the

notification letter shall be provided to the Associate Administrator. An applicant aggrieved by a decision of an approval agency may appeal the decision in writing within 90 days of receipt to the Associate Administrator.

(e) *Modifications to approved portable tanks.* (1) Prior to modification of any approved portable tank which may affect conformance of an IM or UN portable tank, which may involve a change to the design type or which may affect its ability to retain the hazardous material in transportation, the person desiring to make such modification shall inform the approval agency that issued the initial approval of the portable tank (or if unavailable another approval agency) of the nature of the modification and request approval of the modification. The owner or manufacturer shall supply the approval agency with three sets of all revised drawings, calculations, and test data relative to the intended modification.

(2) A statement as to whether the intended modification has been examined by any approval agency previously judged unacceptable. An affirmative statement must be documented with the name of the approving agency, the reason for nonacceptance, and the nature of changes made to the modification since its original rejection.

(3) The approval agency shall review the request for modification, and if it is determined that the proposed modification is in full compliance with the relevant DOT specification, including a UN portable tank, the request shall be approved and the approval agency shall perform the following activities:

(i) Return one set of the approved revised drawings, calculations, and test data to the applicant. The second and third sets of the approved revised drawings, calculations, and data shall be retained by the approval agency as required in § 107.404(a)(3) of this subchapter.

(ii) Ensure through appropriate inspection that all modifications conform to the revised drawings, calculations, and test data.

(iii) Determine the extent to which retesting of the modified tank is necessary based on the nature of the proposed modification, and ensure that all required retests are satisfactorily performed.

(iv) If modification to an approved tank alters any information on the approval certificate, issue a new approval certificate for the modified tank and ensure that any necessary changes are made to the metal identification plate. A copy of each newly issued approval certificate shall be retained by the approval agency and by the owner of each portable tank.

(4) If it determined that the proposed modification is not in compliance with the relevant DOT specification, the request shall be denied. The procedures of paragraph (d) of this section apply to such denial.

(f) *Termination of Approval Certificate.* (1) The Associate Administrator may terminate an approval issued under this section if he determines that:

(i) Information upon which the approval was based is fraudulent or substantially erroneous; or

(ii) Termination of the approval is necessary to adequately protect against risks to life and property; or

(iii) The approval was not issued by the approval agency in good faith; or

(iv) That the portable tank does not meet the specification.

(2) Before an approval is withdrawn, the Associate Administrator gives the interested party(ies):

(i) Written notice of the facts or conduct believed to warrant the withdrawal;

(ii) Opportunity to submit oral and written evidence; and

(iii) Opportunity to demonstrate or achieve compliance with the application requirement.

(3) If the Associate Administrator determines that a certificate of approval must be withdrawn to preclude a significant and imminent adverse affect on public safety, he shall withdraw the certificate of approval issued by a designated approval agency. In such circumstances, the procedures of paragraphs (f)(2) (ii) and (iii) of this section need not be provided prior to withdrawal of the approval, but shall be provided as soon as practicable thereafter.

61. Section 178.274 would be added to subpart H to read as follows:

§ 178.274 Specifications for UN portable tanks.

(a) *General.* (1) Each UN portable tank must meet the requirements of this section. In addition to the requirements of this section, requirements specific to UN portable tanks used for liquid and solid hazardous materials, liquefied compressed gases and refrigerated liquefied gases are provided in §§ 178.275, 178.276 and 178.277, respectively. Requirements for approval, maintenance, inspection, testing and use are provided in § 178.273 and part 180, subpart G, of this subchapter. Any portable tank which meets the definition of a ''container'' within the terms of the International Convention for Safe Containers (CSC) must meet the requirements of the CSC as amended and 49 CFR parts 450 through 453 and must have a CSC safety approval plate.

(2) In recognition of scientific and technological advances, the technical requirements applicable to UN portable tanks may be varied if approved by the Associate Administrator and the portable tank is shown to provide a level of safety equal to or exceeding the requirements of this subchapter with respect to the compatibility of the transported hazardous materials and the ability of the portable tank to withstand impact, loading and fire conditions. Portable tanks approved to alternative technical requirements must be marked ''Alternative Arrangement'' as specified in paragraph (i) of this section.

(3) *Definitions.* The following definitions apply for the purposes of design and construction of UN portable tanks under this subpart:

Alternate Arrangement portable tank means a UN portable tank that has been approved to alternative technical requirements or testing methods other than those specified for UN portable tanks in part 178 or part 180 of this subchapter.

Approval agency means the designated approval agency authorized to approve the portable tank in accordance with the procedures in subpart E, part 107 of this subchapter.

Design pressure is defined differently depending on the hazardous materials intended to be transported in the portable tank. See §§ 178.275, 178.276 and 178.277 as applicable.

Design type means a portable tank or series of portable tanks made of materials of the same material specifications and thicknesses, manufactured by a single manufacturer, using the same fabrication techniques (for example, welding procedures) and made with equivalent structural equipment, closures, and service equipment.

Fine grain steel means steel which has a ferritic grain size of 6 or finer when determined in accordance with ASTM E 112 (incorporated by reference, see § 171.7 of this subchapter).

Jacket means the outer insulation cover or cladding which may be part of the insulation system.

Leakage test means a test using gas to subject the shell and its service equipment to an effective internal pressure of not less than 25% of the MAWP. For portable tanks used for refrigerated liquefied gases the leakage test must be conducted at an effective internal pressure of not less than 90% of the MAWP.

Maximum allowable working pressure (MAWP) is defined differently depending on the hazardous materials intended to be transported in the portable tank. See §§ 178.275, 178.276 and 178.277, as applicable.

Maximum permissible gross mass (MPGM) means the sum of the tare mass of the portable tank and the heaviest hazardous material authorized for transportation.

Mild steel means a steel with a guaranteed minimum tensile strength of 360 N/mm² to 440 N/mm² and a guaranteed minimum elongation at fracture as specified in paragraph § 178.274(c)(11).

Offshore portable tank means a portable tank specially designed for repeated use in the transportation of hazardous materials to, from and between offshore facilities. An offshore portable tank is designed and constructed in accordance with the Guidelines for the Approval of Containers Handled in Open Seas specified in the IMDG Code (incorporated by reference, see § 171.7 of this subchapter).

Reference steel means a steel with a tensile strength of 370 N/mm² and an elongation at fracture of 27%.

Service equipment means measuring instruments and filling, discharge, venting, safety, heating, cooling and insulating devices.

Shell means the part of the portable tank which retains the hazardous materials intended for transportation, including openings and their closures, but does not include service equipment or external structural equipment.

Structural equipment means the reinforcing, fastening, protective and stabilizing members external to the shell.

Test pressure means the maximum gauge pressure at the top of the shell during the hydraulic pressure test equal to not less than 1.5 times the design pressure for liquids and 1.3 for liquefied compressed gases. The minimum test pressure for portable tanks intended for specific hazardous materials is specified in the applicable portable tank T code assigned to a particular hazardous material in the § 172.101 Table of this subchapter.

(b) *General design and construction requirements.* (1) The design temperature range for the shell must be −40 °C to 50 °C (−40 °F to 122 °F) for hazardous materials transported under normal conditions of transportation, except for portable tanks used for refrigerated liquefied gases where the minimum design temperature must not be higher than the lowest (coldest) temperature (for example, service temperature) of the contents during filling, discharge or transportation. For hazardous materials handled under elevated temperature conditions, the design temperature must not be less than the maximum temperature of the hazardous material during filling, discharge or transportation. More severe design temperatures must be considered for portable tanks subjected to severe climatic conditions (for example, portable tanks transported in arctic regions). Shells must be designed and constructed in accordance with the requirements of the ASME Code, Section VIII, Division 1 (incorporated by reference, see § 171.7 of this subchapter), except as limited or modified in this subchapter. For portable tanks used for liquid or solid hazardous materials, a design code other than the ASME Code may be used if approved by the Associate Administrator. Portable tanks used for liquified compressed gases require an ASME certification and U stamp. Shells must be made of metallic materials suitable for forming. Non-metallic materials may be used for the attachments and supports between the shell and jacket, provided their material properties at the minimum and maximum design temperatures are proven to be sufficient. For welded shells, only a material whose weldability has been fully demonstrated may be used. Welds must be of high quality and conform to a level of integrity at least equivalent to the welding requirements specified in the ASME Code, Section VIII for the welding of pressure vessels. When the manufacturing process or the materials make it necessary, the shells must be suitably heat-treated to guarantee adequate toughness in the weld and in the heat affected zones. In choosing the material, the design temperature range must be taken into account with respect to risk of brittle fracture, stress corrosion cracking, resistance to impact, and suitability for the hazardous materials intended for transportation in the portable tank. When fine grain steel is used, the guaranteed value of the yield strength must be not more than 460 N/mm² and the guaranteed value of the upper limit of the tensile strength must be not more than 725 N/mm² according to the material specification. Aluminum may not be used as a construction material for the shell. Portable tank materials must be suitable for the external environment where they will be transported taking into account the determined design temperature range. Portable tanks must be designed to withstand, without loss of contents, at least the internal pressure due to the contents and the static, dynamic and thermal loads during normal conditions of handling and transportation. The design must take into account the effects of fatigue, caused by repeated application of these loads through the expected life of the portable tank.

(2) Portable tank shells, fittings, and pipework must be constructed from materials that are:

(i) Compatible with the hazardous materials intended to be transported; or

(ii) Properly passivated or neutralized by chemical reaction, if applicable; or

(iii) For portable tanks used for liquid and solid materials, lined with corrosion-resistant material directly bonded to the shell or attached by equivalent means.

(3) Gaskets and seals must be made of materials that are compatible with the hazardous materials intended to be transported.

(4) When shells are lined, the lining must be compatible with the hazardous materials intended to be transported, homogeneous, non-porous, free from perforations, sufficiently elastic and compatible with the thermal expansion characteristics of the shell. The lining of every shell, shell fittings and piping must be continuous and must extend around the face of any flange. Where external fittings are welded to the tank, the lining must be continuous through the fitting and around the face of external flanges. Joints and seams in the lining must be made by fusing the material together or by other equally effective means.

(5) Contact between dissimilar metals which could result in damage by galvanic action must be prevented by appropriate measures.

(6) The construction materials of the portable tank, including any devices, gaskets, linings and accessories, must not adversely affect or react with the hazardous materials intended to be transported in the portable tank.

(7) Portable tanks must be designed and constructed with supports that provide a secure base during transportation and with suitable lifting and tie-down attachments.

(c) *Design criteria.* (1) Portable tanks and their fastenings must, under the maximum permissible load, be capable of absorbing the following separately applied static forces (for calculation purposes, acceleration due to gravity (g) = 9.81m/s²):

(i) In the direction of travel: 2g (twice the MPGM multiplied by the acceleration due to gravity);

(ii) Horizontally at right angles to the direction of travel: 1g (the MPGM

multiplied by the acceleration due to gravity);

(iii) Vertically upwards: 1g (the MPGM multiplied by the acceleration due to gravity); and

(iv) Vertically downwards: 2g (twice the MPGM multiplied by the acceleration due to gravity).

(2) Under each of the forces specified in paragraph (c)(1) of this section, the safety factor must be as follows:

(i) For metals having a clearly defined yield point, a design margin of 1.5 in relation to the guaranteed yield strength; or

(ii) For metals with no clearly defined yield point, a design margin of 1.5 in relation to the guaranteed 0.2% proof strength and, for austenitic steels, the 1% proof strength.

(3) The values of yield strength or proof strength must be the values according to recognized material standards. When austenitic steels are used, the specified minimum values of yield strength or proof strength according to the material standards may be increased by up to 15% when these greater values are attested in the material inspection certificate.

(4) Portable tanks must be capable of being electrically grounded to prevent dangerous electrostatic discharge when they are used for Class 2 flammable gases or Class 3 flammable liquids, including elevated temperature materials transported at or above their flash point.

(5) For shells of portable tanks used for liquefied compressed gases, the shell must consist of a circular cross section. Shells must be of a design capable of being stress-analysed mathematically or experimentally by resistance strain gauges as specified in UG–101 of the ASME Code (incorporated by reference, see § 171.7 of this subchapter), or other methods approved by the Associate Administrator.

(6) Shells must be designed and constructed to withstand a hydraulic test pressure of not less than 1.5 times the design pressure for portable tanks used for liquids and 1.3 times the design pressure for portable tanks used for liquefied compressed gases. Specific requirements are provided for each hazardous material in the applicable T Code or portable tank special provision specified in the § 172.101 Table of this subchapter. The minimum shell thickness requirements must also be taken into account.

(7) For metals exhibiting a clearly defined yield point or characterized by a guaranteed proof strength (0.2% proof strength, generally, or 1% proof strength for austenitic steels), the primary membrane stress (sigma) in the shell must not exceed 0.75 Re or 0.50 Rm, whichever is lower, at the test pressure, where:

Re = yield strength in N/mm^2, or 0.2% proof strength or, for austenitic steels, 1% proof strength;

Rm = minimum tensile strength in N/mm^2.

(8) The values of Re and Rm to be used must be the specified minimum values according to recognized material standards. When austenitic steels are used, the specified minimum values for Re and Rm according to the material standards may be increased by up to 15% when greater values are attested in the material inspection certificate.

(9) Steels which have a Re/Rm ratio of more than 0.85 are not allowed for the construction of welded shells. The values of Re and Rm to be used in determining this ratio must be the values specified in the material inspection certificate.

(10) Steels used in the construction of shells must have an elongation at fracture, in percentage, of not less than 10,000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels.

(11) For the purpose of determining actual values for materials for sheet metal, the axis of the tensile test specimen must be at right angles (transversely) to the direction of rolling. The permanent elongation at fracture must be measured on test specimens of rectangular cross sections in accordance with ISO 6892 (see § 171.7 of this subchapter), using a 50 mm gauge length.

(d) *Minimum shell thickness.* (1) The minimum shell thickness must be the greatest thickness of the following:

(i) the minimum thickness determined in accordance with the requirements of paragraphs (d)(2) through (d)(10) of this section;

(ii) the minimum thickness determined in accordance with the ASME Code (incorporated by reference, see § 171.7 of this subchapter) or other approved pressure vessel code; or

(iii) the minimum thickness specified in the applicable T code or portable tank special provision indicated for each hazardous material in the § 172.101 Table of this subchapter.

(2) Shells (cylindrical portions, heads and manhole covers) not more than 1.80 m in diameter may not be less than 5 mm thick in the reference steel or of equivalent thickness in the metal to be used. Shells more than 1.80 m in diameter may not be less than 6 mm thick in the reference steel or of equivalent thickness in the metal to be used. For portable tanks used only for the transportation of powdered or granular solid hazardous materials of Packing Group II or III, the minimum thickness requirement may be reduced to 5 mm in the reference steel or of equivalent thickness in the metal to be used regardless of the shell diameter. For vacuum-insulated tanks, the aggregate thickness of the jacket and the shell must correspond to the minimum thickness prescribed in this paragraph, with the thickness of the shell itself not less than the minimum thickness prescribed in paragraph (d)(3) of this section.

(3) When additional protection against shell damage is provided in the case of portable tanks used for liquid and solid hazardous materials requiring test pressures less than 2.65 bar (265.0 kPa), subject to certain limitations specified in the UN Recommendations (incorporated by reference, see § 171.7 of this subchapter), the Associate Administrator may approve a reduced minimum shell thickness.

(4) The cylindrical portions, heads and manhole covers of all shells must not be less than 3 mm (0.1 inch) thick regardless of the material of construction, except for portable tanks used for liquefied compressed gases where the cylindrical portions, ends (heads) and manhole covers of all shells must not be less than 4 mm (0.2 inch) thick regardless of the material of construction.

(5) When steel that has characteristics other than that of reference steel is used, the equivalent thickness of the shell and heads must be determined according to the following formula:

Where:

$$e_1 = \frac{21.4\, e_0 d_1}{1.8^3 \sqrt{Rm_1 \times A_1}}$$

e_1 = required equivalent thickness (in mm) of the metal to be used;

e_0 = minimum thickness (in mm) of the reference steel specified in the applicable T code or portable tank special provision indicated for each material in the § 172.101 Table of this subchapter;

d_1 = 1.8m, unless the formula is used to determine the equivalent minimum thickness for a portable tank shell that is required to have a minimum thickness of 8mm or 10mm according to the applicable T code indicated in the § 172.101 Table of this subchapter. When reference steel thicknesses of 8mm or 10mm are specified, d_1 is equal to the actual diameter of the shell but not less than 1.8m;

Rm_1 = guaranteed minimum tensile strength (in N/mm^2) of the metal to be used;

A_1 = guaranteed minimum elongation at fracture (in %) of the metal to be used

according to recognized material standards.

(6) The wall and all parts of the shell may not have a thickness less than that prescribed in paragraphs (d)(2), (d)(3) and (d)(4) of this section. This thickness must be exclusive of any corrosion allowance.

(7) There must be no sudden change of plate thickness at the attachment of the heads to the cylindrical portion of the shell.

(e) *Service equipment.* (1) Service equipment must be arranged so that it is protected against the risk of mechanical damage by external forces during handling and transportation. When the connections between the frame and the shell allow relative movement between the sub-assemblies, the equipment must be fastened to allow such movement without risk of damage to working parts. The external discharge fittings (pipe sockets, shut-off devices) and the internal stop-valve and its seating must be protected against mechanical damage by external forces (for example, by using shear sections). The filling and discharge devices (including flanges or threaded plugs) and any protective caps must be capable of being secured against unintended opening.

(2) Each connection to a portable tank must be clearly marked to indicate its function.

(3) Each stop-valve or other means of closure must be designed and constructed to a rated pressure not less than the MAWP of the shell taking into account the temperatures expected during transport. All stop-valves with screwed spindles must close by a clockwise motion of the handwheel. For other stop-valves the position (open and closed) and direction of closure must be clearly indicated. All stop-valves must be designed to prevent unintentional opening.

(4) Piping must be designed, constructed and installed to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration. All piping must be of a suitable metallic material. Welded pipe joints must be used wherever possible.

(5) Joints in copper tubing must be brazed or have an equally strong metal union. The melting point of brazing materials must be no lower than 525 °C (977 °F). The joints must not decrease the strength of the tubing, such as may happen when cutting threads.

(6) The burst pressure of all piping and pipe fittings must be greater than the highest of four times the MAWP of the shell or four times the pressure to which it may be subjected in service by the action of a pump or other device (except pressure relief devices).

(7) External fittings must be grouped together. Filling and discharge connections may be installed below the normal liquid level of the tank if the tank design conforms to the following requirements:

(i) The portable tank must be permanently mounted in a full framework for containerized transport. For each portable tank design, a prototype portable tank, must fulfill the requirements of parts 450 through 453 of this title for compliance with the requirements of Annex II of the International Convention for Safe Containers.

(ii) Each filling and discharge connection must be equipped with an internal self-closing stop-valve capable of closing within 30 seconds of actuation. Each internal self-closing stop-valve must be protected by a shear section or sacrificial device located outboard of the valve. The shear section or sacrificial device must break at no more than 70 percent of the load that would cause failure of the internal self-closing stop-valve.

(iii) Each internal self-closing stop-valve must be provided with remote means of automatic closure, both thermal and mechanical. The thermal means of automatic closure must actuate at a temperature of not over 121 °C (250 °F).

(8) Ductile metals must be used in the construction of valves and accessories.

(f) *Pressure relief devices.*—(1) *Marking of pressure relief devices.* Every pressure relief device must be clearly and permanently marked with the following:

(i) the pressure (in bar or kPa) or temperature for fusible elements (in °C) at which it is set to discharge;

(ii) the allowable tolerance at the discharge pressure for reclosing devices;

(iii) the reference temperature corresponding to the rated pressure for frangible discs;

(iv) the allowable temperature tolerance for fusible elements;

(v) the rated flow capacity of the device in standard cubic meters of air per second (m^3/s) determined according to ISO 4126–1 (incorporated by reference, see § 171.7 of this subchapter); and

(vi) when practicable, the device must show the manufacturer's name and product number.

(2) *Connections to pressure relief devices.* Connections to pressure relief devices must be of sufficient size to enable the required discharge to pass unrestricted to the safety device. No stop-valve may be installed between the shell and the pressure relief devices except where duplicate devices are provided for maintenance or other reasons and the stop-valves serving the devices actually in use are locked open or the stop-valves are interlocked so that at least one of the duplicate devices is always in use. There must be no obstruction in an opening leading to a vent or pressure relief device which might restrict or cut-off the flow from the shell to that device. Vents or pipes from the pressure relief device outlets, when used, must deliver the relieved vapor or liquid to the atmosphere in conditions of minimum back-pressure on the relieving devices.

(3) *Location of pressure relief devices.* (i) Each pressure relief device inlet must be situated on top of the shell in a position as near the longitudinal and transverse center of the shell as reasonably practicable. All pressure relief device inlets must, under maximum filling conditions, be situated in the vapor space of the shell and the devices must be so arranged as to ensure that escaping vapor is discharged unrestrictedly. For flammable hazardous materials, the escaping vapor must be directed away from the shell in such a manner that it cannot impinge upon the shell. For refrigerated liquefied gases, the escaping vapor must be directed away from the tank and in such a manner that it cannot impinge upon the tank. Protective devices which deflect the flow of vapor are permissible provided the required relief-device capacity is not reduced.

(ii) Arrangements must be made to prevent unauthorized persons from access to the pressure relief devices and to protect the devices from damage caused by the portable tank overturning.

(g) *Gauging devices.* Unless a portable tank is intended to be filled by weight, it must be equipped with one or more gauging devices. Glass level-gauges and gauges made of other fragile material, which are in direct communication with the contents of the tank are prohibited. A connection for a vacuum gauge must be provided in the jacket of a vacuum-insulated portable tank.

(h) *Portable tank supports, frameworks, lifting and tie-down attachments.* (1) Portable tanks must be designed and constructed with a support structure to provide a secure base during transport. The forces and safety factors specified in paragraphs (c)(1) and (c)(2) of this section, respectively, must be taken into account in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable.

(2) The combined stresses caused by portable tank mountings (for example,

cradles, framework, etc.) and portable tank lifting and tie-down attachments must not cause excessive stress in any portion of the shell. Permanent lifting and tie-down attachments must be fitted to all portable tanks. Preferably they should be fitted to the portable tank supports but may be secured to reinforcing plates located on the shell at the points of support. Each portable tank must be designed so that the center of gravity of the filled tank is approximately centered within the points of attachment for lifting devices.

(3) In the design of supports and frameworks, the effects of environmental corrosion must be taken into account.

(4) Forklift pockets must be capable of being closed off. The means of closing forklift pockets must be a permanent part of the framework or permanently attached to the framework. Single compartment portable tanks with a length less than 3.65 m need not have forklift pockets that are capable of being closed off provided that:

(i) The shell, including all the fittings, are well protected from being hit by the forklift blades; and

(ii) The distance between forklift pockets (measured from the center of each pocket) is at least half of the maximum length of the portable tank.

(5) During transport, portable tanks must be adequately protected against damage to the shell, and service equipment resulting from lateral and longitudinal impact and overturning on the shell and service equipment must be constructed to withstand impact or overturning. External fittings must be protected so as to preclude the release of the shell contents upon impact or overturning of the portable tank on its fittings. Examples of protection include:

(i) Protection against lateral impact which may consist of longitudinal bars protecting the shell on both sides at the level of the median line;

(ii) Protection of the portable tank against overturning which may consist of reinforcement rings or bars fixed across the frame;

(iii) Protection against rear impact which may consist of a bumper or frame;

(iv) Protection of the shell against damage from impact or overturning by use of an ISO frame in accordance with ISO 1496–3 (incorporated by reference, see § 171.7 of this subchapter); and

(v) Protection of the portable tank from impact or overturning by a vacuum insulation jacket.

(i) *Marking.* (1) Every portable tank must be fitted with a corrosion resistant metal plate permanently attached to the portable tank in a conspicuous place and readily accessible for inspection. When the plate cannot be permanently attached to the shell, the shell must be marked with at least the information required by the ASME Code (incorporated by reference, see § 171.7 of this subchapter). At a minimum, the following information must be marked on the plate by stamping or by any other similar method:

Country of manufacture
UN
Approval Country
Approval Number
Alternative Arrangements ''AA'' (see § 178.274(a)(2))
Manufacturer's name or mark
Manufacturer's serial number
Approval Agency (Authorized body for the design approval)
Owner's registration number
Year of manufacture
Pressure vessel code to which the shell is designed
Test pressure _____ bar gauge.
MAWP _____ bar gauge.
External design pressure (not required for portable tanks used for refrigerated liquefied gases) _____ bar/gauge.
Design temperature range _____ °C to _____ °C. (For portable tanks used for refrigerated liquefied gases, the minimum design temperature must be marked.)
Water capacity at 20 °C/ _____ liters.
Water capacity of each compartment at 20 °C _____ liters.
Initial pressure test date and witness identification.
MAWP for heating/cooling system _____ bar gauge.
Shell material(s) and material standard reference(s).
Equivalent thickness in reference steel _____ mm.
Lining material (when applicable).
Date and type of most recent periodic test(s).
Month _____ Year _____ Test pressure _____ bar/gauge.
Stamp of approval agency that performed or witnessed the most recent test.
For portable tanks used for refrigerated liquefied gases:
Either ''thermally insulated'' or ''vacuum insulated'' _____.
Effectiveness of the insulation system (heat influx) _____ Watts (W).
Reference holding time _____ days or hours and initial pressure _____ bar/kPa gauge and degree of filling _____ in kg for each refrigerated liquefied gas permitted for transportation.

(2) The following information must be marked either on the portable tank itself or on a metal plate firmly secured to the portable tank:

Name of the operator.
Name of hazardous materials being transported and maximum mean bulk temperature (except for refrigerated liquefied gases, the name and temperature are only required when the maximum mean bulk temperature is higher than 50 °C).
Maximum permissible gross mass (MPGM) _____ kg.
Unladen (tare) mass _____ kg.

Note to Paragraph (i)(2): For the identification of the hazardous materials being transported refer to part 172 of this subchapter.

(3) If a portable tank is designed and approved for open seas operations, such as offshore oil exploration, in accordance with the IMDG Code, the words ''OFFSHORE PORTABLE TANK'' must be marked on the identification plate.

62. Section 178.275 would be added to subpart H to read as follows:

§ 178.275 Specification for UN Portable Tanks intended for the transportation of liquid and solid hazardous materials.

(a) In addition to the requirements of § 178.274, the following definitions and requirements apply to UN portable tanks intended for the transportation of liquid and solid hazardous materials:

(1) *Design pressure* means the pressure to be used in calculations required by the recognized pressure vessel code. The design pressure must not be less than the highest of the following pressures:

(i) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(ii) The sum of:

(A) The absolute vapor pressure (in bar) of the hazardous material at 65 °C, minus 1 bar (149 °F, minus 100 kPa);

(B) The partial pressure (in bar) of air or other gases in the ullage space, resulting from their compression during filling without pressure relief by a maximum ullage temperature of 65 °C (149 °F) and a liquid expansion due to an increase in mean bulk temperature of 35 °C (95 °F); and

(C) A head pressure determined on the basis of the forces specified in § 178.274(c), but not less than 0.35 bar (35 kPa).

(2) *Maximum allowable working pressure (MAWP)* means a pressure that must not be less than the highest of the following pressures measured at the top of the shell while in operating position:

(i) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(ii) The maximum effective gauge pressure to which the shell is designed which must be not less than the design pressure.

(b) *Service equipment.* (1) In addition to the requirements specified in § 178.274, for service equipment, all openings in the shell, intended for filling or discharging the portable tank must be fitted with a manually operated stop-valve located as close to the shell

as reasonably practicable. Other openings, except for openings leading to venting or pressure relief devices, must be equipped with either a stop-valve or another suitable means of closure located as close to the shell as reasonably practicable.

(2) All portable tanks must be fitted with a manhole or other inspection openings of a suitable size to allow for internal inspection and adequate access for maintenance and repair of the interior. Compartmented portable tanks must have a manhole or other inspection openings for each compartment.

(3) For insulated portable tanks, top fittings must be surrounded by a spill collection reservoir with suitable drains.

(4) Piping must be designed, constructed and installed to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration. All piping must be of a suitable metallic material. Welded pipe joints must be used wherever possible.

(c) *Bottom openings.* (1) Certain hazardous materials may not be transported in portable tanks with bottom openings. When the applicable T code or portable tank special provision, as referenced for materials in the § 172.101 Table of this subchapter, specifies that bottom openings are prohibited, there must be no openings below the liquid level of the shell when it is filled to its maximum permissible filling limit. When an existing opening is closed, it must be accomplished by internally and externally welding one plate to the shell.

(2) Bottom discharge outlets for portable tanks carrying certain solid, crystallizable or highly viscous hazardous materials must be equipped with at least two serially fitted and mutually independent shut-off devices. Use of only two shut-off devices is only authorized when this paragraph is referenced in the applicable T Code indicated for each hazardous material in the § 172.101 Table of this subchapter. The design of the equipment must be to the satisfaction of the approval agency and must include:

(i) An external stop-valve fitted as close to the shell as reasonably practicable; and

(ii) A liquid tight closure at the end of the discharge pipe, which may be a bolted blank flange or a screw cap.

(3) Except as provided in paragraph (c)(2) of this section, every bottom discharge outlet must be equipped with three serially fitted and mutually independent shut-off devices. The design of the equipment must be to the satisfaction of the approval agency and must include:

(i) A self-closing internal stop-valve, which is a stop-valve within the shell or within a welded flange or its companion flange, such that:

(A) The control devices for the operation of the valve are designed to prevent any unintended opening through impact or other inadvertent act;

(B) The valve is operable from above or below;

(C) If possible, the setting of the valve (open or closed) must be capable of being verified from the ground;

(D) Except for portable tanks having a capacity less than 1,000 liters (264.2 gallons), it must be possible to close the valve from an accessible position of the portable tank that is remote from the valve itself; and

(E) The valve must continue to be effective in the event of damage to the external device for controlling the operation of the valve;

(ii) An external stop-valve fitted as close to the shell as reasonably practicable; and

(iii) A liquid tight closure at the end of the discharge pipe, which may be a bolted blank flange or a screw cap.

(4) For a lined shell, the internal stop-valve required by paragraph (c)(3)(i) of this section may be replaced by an additional external stop-valve.

(d) *Pressure relief devices.* All portable tanks must be fitted with at least one pressure relief device. All relief devices must be designed, constructed and marked in accordance with the requirements of this subchapter.

(e) *Vacuum-relief devices.* (1) A shell which is to be equipped with a vacuum-relief device must be designed to withstand, without permanent deformation, an external pressure of not less than 0.21 bar (21.0 kPa) above the internal pressure. The vacuum-relief device must be set to relieve at a vacuum setting not greater than minus (−) 0.21 bar (−21.0 kPa) unless the shell is designed for a higher external over pressure, in which case the vacuum-relief pressure of the device to be fitted must not be greater than the tank design vacuum pressure. A shell that is not fitted with a vacuum-relief device must be designed to withstand, without permanent deformation, an external pressure of not less than 0.4 bar (40.0 kPa) above the internal pressure.

(2) Vacuum-relief devices used on portable tanks intended for the transportation of hazardous materials meeting the criteria of Class 3, including elevated temperature hazardous materials transported at or above their flash point, must prevent the immediate passage of flame into the shell or the portable tank must have a shell capable of withstanding, without leakage, an internal explosion resulting from the passage of flame into the shell.

(f) *Pressure relief devices.* (1) Each portable tank with a capacity not less than 1,900 liters (501.9 gallons) and every independent compartment of a portable tank with a similar capacity, must be provided with one or more pressure relief devices of the reclosing type. Such portable tanks may, in addition, have a frangible disc or fusible element in parallel with the reclosing devices, except when the applicable T code assigned to a hazardous material requires that the frangible disc precede the pressure relief device, according to paragraph (f)(3) of this section, or when no bottom openings are allowed. The pressure relief devices must have sufficient capacity to prevent rupture of the shell due to over pressurization or vacuum resulting from filling, discharging, from heating of the contents or fire.

(2) Pressure relief devices must be designed to prevent the entry of foreign matter, the leakage of liquid and the development of any dangerous excess pressure.

(3) When required for certain hazardous materials by the applicable T code or portable tank special provision specified for a hazardous material in the § 172.101 Table of this subchapter, portable tanks must have a pressure relief device consistent with the requirements of this subchapter. Except for a portable tank in dedicated service that is fitted with an approved relief device constructed of materials compatible with the hazardous material, the relief device system must include a frangible disc preceding a reclosing pressure relief device. A pressure gauge or suitable tell-tale indicator for the detection of disc rupture, pin-holing or leakage must provide the space between the frangible disc and the pressure relief device. The frangible disc must rupture at a nominal pressure 10% above the start to discharge pressure of the relief device.

(4) Every portable tank with a capacity less than 1,900 liters (501.9 gallons) must be fitted with a pressure relief device, which may be a frangible disc when this disc is set to rupture at a nominal pressure equal to the test pressure at any temperature within the design temperature range.

(5) When the shell is fitted for pressure discharge, a suitable pressure relief device must provide the inlet line to the portable tank set to operate at a pressure not higher than the MAWP of the shell, and a stop-valve must be fitted as close to the shell to minimize the potential for damage.

(6) *Setting of pressure relief devices.* (i) Pressure relief devices must operate only in conditions of excessive rise in temperature, since the shell must not be subject to undue fluctuations of pressure during normal conditions of transportation.

(ii) The required pressure relief device must be set to start-to-discharge at a nominal pressure of five-sixths of the test pressure for shells having a test pressure of not more than 4.5 bar (450 kPa) and 110% of two-thirds of the test pressure for shells having a test pressure of more than 4.5 bar (450 kPa). A self-closing relief device must close at a pressure not more than 10% below the pressure at which the discharge starts. The device must remain closed at all lower pressures. This requirement does not prevent the use of vacuum-relief or combination pressure relief and vacuum-relief devices.

(g) *Fusible elements.* Fusible elements must operate at a temperature between 110 °C (230 °F) and 149 °C (300.2 °F) provided that the pressure in the shell at the fusing temperature will not exceed the test pressure. They must be placed at the top of the shell with their inlets in the vapor space and in no case may they be shielded from external heat. Fusible elements must not be utilized on portable tanks with a test pressure which exceeds 2.65 bar (265.0 kPa). Fusible elements used on portable tanks intended for the transport of elevated temperature hazardous materials must be designed to operate at a temperature higher than the maximum temperature that will be experienced during transport and must be to the satisfaction of the approval agency.

(h) *Capacity of pressure relief devices.* (1) The reclosing pressure relief device required by paragraph (f)(1) must have a minimum cross sectional flow area equivalent to an orifice of 31.75 mm (1.3 inches) diameter. Vacuum-relief devices, when used, must have a cross sectional flow area not less than 284 mm^2 (11.2 $inches^2$).

(2) Under conditions of complete fire engulfment of the portable tank, the combined delivery capacity of the relief devices must be sufficient to limit the pressure in the shell to 20% above the start-to-discharge pressure specified in paragraph(f)(6) of this section. Emergency pressure relief devices may be used to achieve the full relief capacity prescribed. The total required capacity of the relief devices may be determined using the formula in paragraph (h)(2)(i) of this section or the table in paragraph (h)(2)(iii) of this section.

(i)(A) To determine the total required capacity of the relief devices, which must be regarded as being the sum of the individual capacities of all the contributing devices, the following formula must be used:

$$Q = 12.4\frac{FA^{0.82}}{LC}\sqrt{\frac{ZT}{M}}$$

Where:

Q = minimum required rate of discharge in cubic meters of air per second (m^3/s) at standard conditions: 1 bar and 0 °C (273 K);

F = for uninsulated shells: 1; for insulated shells: U(649 − t)/13.6 but in no case is less than 0.25 where: U = thermal conductance of the insulation in $kW \cdot m^{-2} \cdot K^{-1}$, at 38 °C; and t = actual temperature of the hazardous material during filling (in °C) or when this temperature is unknown, let t = 15 °C. The value of F given above for insulated shells may only be used if the insulation is in conformance with paragraph (h)(2)(iv) of this section;

A = total external surface area of shell in square meters;

Z = the gas compressibility factor in the accumulating condition (when this factor is unknown, let Z equal 1.0);

T = absolute temperature in Kelvin (°C + 273) above the pressure relief devices in the accumulating condition;

L = the latent heat of vaporization of the liquid, in kJ/kg, in the accumulating condition;

M = molecular weight of the hazardous material.

(B) The constant C, as shown in the formula in paragraph (h)(2)(i)(A) of this section, is derived from one of the following formula as a function of the ratio k of specific heats:

$$k = \frac{C_p}{C_v}$$

Where:

c_p is the specific heat at constant pressure; and

c_v is the specific heat at constant volume.

(C) When $k > 1$:

$$C = \sqrt{k\left(\frac{2}{k+1}\right)^{\frac{k+1}{k-1}}}$$

(D) When $k = 1$ or k is unknown, a value of 0.607 may be used for the constant C. C may also be taken from the following table:

C CONSTANT VALUE TABLE

k	C	k	C	k	C
1.00	0.607	1.26	0.660	1.52	0.704
1.02	0.611	1.28	0.664	1.54	0.707
1.04	0.615	1.30	0.667	1.56	0.710
1.06	0.620	1.32	0.671	1.58	0.713
1.08	0.624	1.34	0.674	1.60	0.716
1.10	0.628	1.36	0.678	1.62	0.719
1.12	0.633	1.38	0.681	1.64	0.722
1.14	0.637	1.40	0.685	1.66	0.725
1.16	0.641	1.42	0.688	1.68	0.728
1.18	0.645	1.44	0.691	1.70	0.731
1.20	0.649	1.46	0.695	2.00	0.770
1.22	0.652	1.48	0.698	2.20	0.793
1.24	0.656	1.50	0.701	.....	

(ii) As an alternative to the formula in paragraph (h)(2)(i) of this section, relief devices for shells used for transporting liquids may be sized in accordance with the table in paragraph (h)(2)(iii) of this section. The table in paragraph (h)(2)(iii) of this section assumes an insulation value of F = 1 and must be adjusted accordingly when the shell is insulated. Other values used in determining the table in paragraph (h)(2)(iii) of this section are: L = 334.94 kJ/kg; M = 86.7; T = 394 K; Z = 1; and C = 0.607.

(iii) Minimum emergency vent capacity, Q, in cubic meters per air per second at 1 bar and 0 °C (273 K), as shown in the following table:

MINIMUM EMERGENCY VENT CAPACITY

[Q Values]

A Exposed area (square meters)	Q (Cubic meters of air per second)	A Exposed area (square meters)	Q (Cubic meters of air per second)
2	0.230	37.5	2.539
3	0.320	40	2.677
4	0.405	42.5	2.814
5	0.487	45	2.949
6	0.565	47.5	3.082
7	0.641	50	3.215
8	0.715	52.5	3.346
9	0.788	55	3.476
10	0.859	57.5	3.605
12	0.998	60	3.733
14	1.132	62.5	3.860
16	1.263	65	3.987
18	1.391	67.5	4.112
20	1.517	70	4.236
22.5	1.670	75	4.483
25	1.821	80	4.726
27.5	1.969	85	4.967
30	2.115	90	5.206
32.5	2.258	95	5.442
35	2.400	100	5.676

(iv) Insulation systems, used for the purpose of reducing venting capacity, must be approved by the approval agency. In all cases, insulation systems approved for this purpose must:

(A) Remain effective at all temperatures up to 649 °C (1200.2 °F); and

(B) Be jacketed with a material having a melting point of 700 °C (1292 °F) or greater.

(i) *Approval, inspection and testing.* Approval procedures for UN portable tanks are specified in § 178.273. Inspection and testing requirements are specified in § 180.605 of this subchapter.

63. Section 178.276 would be added to subpart H to read as follows:

§ 178.276 Requirements for the design, construction, inspection and testing of portable tanks intended for the transportation of liquefied compressed gases.

(a) In addition to the requirements of § 178.274 applicable to UN portable tanks, the following requirements apply to UN portable tanks used for liquefied compressed gases. In addition to the definitions in § 178.274, the following definitions apply:

Design pressure means the pressure to be used in calculations required by the ASME Code (incorporated by reference, see § 171.7 of this subchapter). The design pressure must be not less than the highest of the following pressures:

(i) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(ii) The sum of:

(A) The maximum effective gauge pressure to which the shell is designed as defined in this paragraph under ''MAWP''; and

(B) A head pressure determined on the basis of the dynamic forces specified in paragraph (h) of this section, but not less than 0.35 bar (35 kPa).

Note to Paragraph (a)(1): For the purpose of this section, the term ''design pressure'' as used in this specification is identical to the term ''maximum allowable working pressure'' as used in the ASME Code, Section VIII.

(2) *Design reference temperature* means the temperature at which the vapor pressure of the contents is determined for the purpose of calculating the MAWP. The value for each portable tank type is as follows:

(i) Shell with a diameter of 1.5 meters or less: 65 °C; or

(ii) Shell with a diameter of more than 1.5 meters:

(A) Without insulation or sun shield: 60 °C;

(B) With sun shield: 55 °C; and

(C) With insulation: 50 °C.

(3) *Filling density* means the average mass of liquefied compressed gas per liter of shell capacity (kg/l).

(4) *Maximum allowable working pressure (MAWP)* means a pressure that must be not less than the highest of the following pressures measured at the top of the shell while in operating position, but in no case less than 7 bar (700 kPa):

(i) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(ii) The maximum effective gauge pressure to which the shell is designed, which must be:

(A) Not less than the pressure specified for each liquefied compressed gas listed in portable tank special provision T50; and

(B) Not less than the sum of:

(*1*) The absolute vapor pressure (in bar) of the liquefied compressed gas at the design reference temperature minus 1 bar; and

(*2*) The partial pressure (in bar) of air or other gases in the ullage space which is determined by the design reference temperature and the liquid phase expansion due to the increase of the mean bulk temperature of t_r-t_f (t_f = filling temperature, usually 15 °C, t_r = 50 °C maximum mean bulk temperature);

(b) *General design and construction requirements.* (1) Tanks must be of seamless or welded steel construction, or combination of both, and have a water capacity greater than 450 liters (118.9 gallons). Tanks must be designed, constructed, certified and stamped in accordance with the ASME Code, Section VIII (incorporated by reference, see § 171.7 of this subchapter).

(2) Portable tanks must be postweld heat-treated and radiographed as prescribed in the ASME Code, except that each portable tank constructed in accordance with part UHT of the ASME Code must be postweld heat-treated. Where postweld heat treatment is required, the portable tank must be treated as a unit after completion of all the welds in and/or to the shell and heads. The method must be as prescribed in the ASME Code. Welded attachments to pads may be made after postweld heat treatment is made. A portable tank used for anhydrous ammonia must be postweld heat-treated. The postweld heat treatment must be as prescribed in the ASME Code, but in no event at less than 1050 °F tank metal temperature. Additionally, portable tanks constructed in accordance with part UHT of the ASME Code must conform to the following requirements:

(i) Welding procedure and welder performance tests must be made annually in accordance with section IX of the ASME Code. In addition to the essential variables named therein, the following must be considered to be essential variables: number of passes, thickness of plate, heat input per pass, and manufacturer's identification of rod and flux. The number of passes, thickness of plate and heat input per pass may not vary more than 25 percent from the procedure qualification. Records of the qualification must be retained for at least 5 years by the tank manufacturer and made available to duly identified representatives of the Department of Transportation or the owner of the tank.

(ii) Impact tests must be made on a lot basis. A lot is defined as 100 tons or less of the same heat and having a thickness variation no greater than plus or minus 25 percent. The minimum impact required for full-sized specimens shall be 20 foot-pounds (or 10 foot-pounds for half-sized specimens) at 0° F Charpy V-Notch in both the longitudinal and transverse direction. If the lot test does not pass this requirement, individual plates may be accepted if they individually meet this impact requirement.

(3) Welding procedures and welder performance tests must be made annually in accordance with Section IX of the ASME Code. In addition to the essential variables named therein, the following must be considered to be essential variables: number of passes, thickness of plate, heat input per pass, and manufacturer's identification of rod and flux. The number of passes,

thickness of plate and heat input per pass may not vary more than 25% from the procedure qualification. Records of the qualification must be retained for at least 5 years by the portable tank manufacturer and made available to the approval agency and the owner of the tank as specified in § 178.273.

(4) Impact tests must be made on a lot basis. A lot is defined as 100 tons or less of raw material of the same heat and having a thickness variation no greater than plus or minus 25%. The minimum impact required for full-sized specimens must be 20 foot-pounds (or 10 foot-pounds for half-sized specimens) at 0° F Charpy V-Notch in both the longitudinal and transverse direction. If the lot test does not pass this requirement, individual plates may be accepted if they individually meet this impact requirement.

(5) When the shells intended for the transportation of liquefied compressed gases are equipped with thermal insulation, a device must be provided to prevent any dangerous pressure from developing in the insulating layer in the event of a leak, when the protective covering is so closed as to be gas-tight. The thermal insulation must not inhibit access to the fittings and discharge devices. In addition, the thermal insulation systems must satisfy the following requirements:

(i) Consist of a shield covering not less than the upper third, but not more than the upper half of the surface of the shell, and separated from the shell by an air space of approximately 40 mm across; or

(ii) Consist of a complete cladding of insulating materials. The insulation must be of adequate thickness and constructed to prevent the ingress of moisture and damage to the insulation. The insulation and cladding must have a thermal conductance of not more than 0.67 ($W \cdot m^{-2} \cdot K^{-1}$) under normal conditions of transportation.

(c) *Service equipment.* (1) All openings with a diameter of more than 1.5 mm (.1 inch) in shells of portable tanks, except openings for pressure-relief devices, inspection openings and closed bleed holes, must be fitted with at least three mutually independent shut-off devices in series: the first being an internal stop-valve, excess flow valve, integral excess flow valve, or excess flow feature device (see § 178.337–1(g)), the second being an external stop-valve and the third being a blank flange or equivalent device.

(2) When a portable tank is fitted with an excess flow valve, the excess flow valve must be so fitted that its seating is inside the shell or inside a welded flange or, when fitted externally, its mountings must be designed so that in the event of impact it must maintain its effectiveness. The excess flow valves must be selected and fitted so as to close automatically when the rated flow specified by the manufacturer is reached. Connections and accessories leading to or from such a valve must have a capacity for a flow more than the excess flow valve's rated flow.

(3) For filling and discharge openings, the first shut-off device must be an internal stop-valve and the second must be a stop-valve placed in an accessible position on each discharge and filling pipe.

(4) For filling and discharge bottom openings of portable tanks intended for the transportation of flammable and/or toxic liquefied compressed gases, the internal stop-valve must be a quick closing safety device that closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. Except for portable tanks having a capacity of not more than 1,000 liters (264.2 gallons), it must be possible to operate this device by remote control.

(5) In addition to filling, discharge and gas pressure equalizing orifices, shells may have openings in which gauges, thermometers and manometers can be fitted. Connections for such instruments must be made by suitable welded nozzles or pockets and may not be connected by screwed connections through the shell.

(6) All portable tanks must be fitted with manholes or other inspection openings of suitable size to allow for internal inspection and adequate access for maintenance and repair of the interior.

(d) *Bottom openings.* Bottom openings are prohibited on portable tanks when the portable tank special provision T50 in § 172.102(c)(7) of this subchapter indicates that bottom openings are not allowed. In this case, there may be no openings located below the liquid level of the shell when it is filled to its maximum permissible filling limit.

(e) *Pressure relief devices.* (1) Portable tanks must be provided with one or more reclosing pressure relief devices. The pressure relief devices must open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. These devices must, after discharge, close at a pressure not less than 10% below the pressure at which discharge starts and must remain closed at all lower pressures. The pressure relief devices must be of a type that will resist dynamic forces including liquid surge. A frangible disc may only be used in series with a reclosing pressure relief device.

(2) Pressure relief devices must be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

(3) Portable tanks intended for the transportation of certain liquefied compressed gases identified in portable tank special provision T50 in § 172.102 of this subchapter must have a pressure relief device which conforms to the requirements of this subchapter. Unless a portable tank in dedicated service is fitted with a relief device constructed of materials compatible with the hazardous material, the relief device must comprise a frangible disc preceded by a reclosing device. The space between the frangible disc and the device must be provided with a pressure gauge or a suitable tell-tale indicator. This arrangement must facilitate the detection of disc rupture, pinholing or leakage which could cause a malfunction of the pressure relief device. The frangible discs must rupture at a nominal pressure 10% above the start-to-discharge pressure of the relief device.

(4) In the case of portable tanks used for more than one gas, the pressure relief devices must open at a pressure indicated in paragraph (f) of this section for the gas having the highest maximum allowable pressure of the gases allowed to be transported in the portable tank.

(f) *Capacity of relief devices.* The combined delivery capacity of the relief devices must be sufficient so that, in the event of total fire engulfment, the pressure inside the shell cannot exceed 120% of the MAWP. Reclosing relief devices must be used to achieve the full relief capacity prescribed. In the case of portable tanks used for more than gas, the combined delivery capacity of the pressure relief devices must be taken for the liquefied compressed gas which requires the highest delivery capacity of the liquefied compressed gases allowed to be transported in the portable tank. The total required capacity of the relief devices must be determined according to the requirements in § 178.275(h). These requirements apply only to liquefied compressed gases which have critical temperatures well above the temperature at the accumulating condition. For gases which have critical temperatures near or below the temperature at the accumulating condition, the calculation of the pressure relief device delivery capacity must consider the additional thermodynamic properties of the gas (for example, CGA S–1.2–1995;

incorporated by reference, see § 171.7 of this subchapter).

64. A new § 178.277 would be added to subpart H to read as follows:

§ 178.277 Requirements for the design, construction, inspection and testing of portable tanks intended for the transportation of refrigerated liquefied gases.

(a) In addition to the requirements of § 178.274 applicable to UN portable tanks, the following requirements and definitions apply to UN portable tanks used for refrigerated liquefied gases:

(1) *Design pressure.* For the purpose of this section the term *design pressure* is consistent with the definition for design pressure in the ASME Code, Section VIII (incorporated by reference, see § 171.7 of this subchapter).

(2) *Holding time* is the time, as determined by testing, that will elapse from loading until the pressure of the contents, under equilibrium conditions, reaches the lowest set pressure of the pressure limiting device(s) (for example, pressure control valve or pressure relief device). Holding time must be determined as specified in § 178.338–9.

(3) *Maximum allowable working pressure (MAWP)* means the maximum effective gauge pressure permissible at the top of the shell of a loaded portable tank in its operating position including the highest effective pressure during filling and discharge;

(4) *Minimum design temperature* means the temperature which is used for the design and construction of the shell not higher than the lowest (coldest) service temperature of the contents during normal conditions of filling, discharge and transportation.

(5) *Shell* means the part of the portable tank which retains the refrigerated liquefied gas intended for transport, including openings and their closures, but does not include service equipment or external structural equipment.

(6) *Tank* means a construction which normally consists of either :

(i) A jacket and one or more inner shells where the space between the shell(s) and the jacket is exhausted of air (vacuum insulation) and may incorporate a thermal insulation system; or

(ii) A jacket and an inner shell with an intermediate layer of solid thermally insulating material (for example, solid foam).

(b) *General design and construction requirements.* (1) Portable tanks must be of seamless or welded steel construction and have a water capacity of more than 450 liters (118.9 gallons). Portable tanks must be designed, constructed, certified and stamped in accordance with the ASME Code (incorporated by reference, see § 171.7 of this subchapter).

(2) Portable tanks must be postweld heat treated and radiographed as prescribed in the ASME Code except that each tank constructed in accordance with part UHT of the ASME Code must be postweld heat treated. Where postweld heat treatment is required, the tank must be treated as a unit after completion of all the welds to the shell and heads. The method must be as prescribed in the ASME Code. Welded attachments to pads may be made after postweld heat treatment is made. The postweld heat treatment must be as prescribed in the ASME Code, but in no event at less than 1050 °F tank metal temperature.

(3) Welding procedure and welder performance tests must be made annually in accordance with Section IX of the ASME Code (incorporated by reference, see § 171.7 of this subchapter). In addition to the essential variables named in the ASME Code, the following must be considered as essential variables: number of passes, thickness of plate, heat input per pass, and the specified rod and flux. The number of passes, thickness of plate and heat input per pass may not vary more than 25% from the procedure qualification. Records of the qualification must be retained for at least 5 years by the portable tank manufacturer and made available to the approval agency and the owner of the portable tank as specified in § 178.273.

(4) Impact tests must be made on a lot basis. A lot is defined as 100 tons or less of the same heat and having a thickness variation no greater than plus or minus 25%. The minimum impact required for full-sized specimens must be 20 foot-pounds (or 10 foot-pounds for half-sized specimens) at 0 °F Charpy V-Notch in both the longitudinal and transverse direction. If the lot test does not pass this requirement, individual plates may be accepted if they individually meet this impact requirement.

(5) Shells and jackets must be made of metallic materials suitable for forming. Jackets must be made of steel. Non-metallic materials may be used for the attachments and supports between the shell and jacket, provided their material properties at the minimum design temperature are proven to be sufficient. In choosing the material, the minimum design temperature must be taken into account with respect to risk of brittle fracture, to hydrogen embrittlement, to stress corrosion cracking and to resistance to impact.

(6) Any part of a portable tank, including fittings, gaskets and pipe-work, which can be expected normally to come into contact with the refrigerated liquefied gas transported must be compatible with that refrigerated liquefied gas.

(7) The thermal insulation system must include a complete covering of the shell with effective insulating materials. External insulation must be protected by a jacket so as to prevent the ingress of moisture and other damage under normal transport conditions.

(8) When a jacket is so closed as to be gas-tight, a device must be provided to prevent any dangerous pressure from developing in the insulation space.

(9) Materials which may react with oxygen or oxygen enriched atmospheres in a dangerous manner may not be used in portable tanks intended for the transport of refrigerated liquefied gases having a boiling point below minus 182 °C at atmospheric pressure in locations with the thermal insulation where there is a risk of contact with oxygen or with oxygen enriched fluid.

(10) Insulating materials must not deteriorate unduly in service.

(11) A reference holding time must be determined for each refrigerated liquefied gas intended for transport in a portable tank. The reference holding time must be determined by testing in accordance with the requirements of § 178.338–9, considering the following factors:

(i) The effectiveness of the insulation system, determined in accordance with paragraph (b)(12) of this section;

(ii) The lowest set pressure of the pressure limiting device;

(iii) The initial filling conditions;

(iv) An assumed ambient temperature of 30 °C (86 °F);

(v) The physical properties of the individual refrigerated liquefied gas intended to be transported.

(12) The effectiveness of the insulation system (heat influx in watts) may be determined by type testing the portable tank in accordance with a procedure specified in § 178.338–9(c) or by using the holding time test in § 178.338–9(b). This test must consist of either:

(i) A constant pressure test (for example, at atmospheric pressure) when the loss of refrigerated liquefied gas is measured over a period of time; or

(ii) A closed system test when the rise in pressure in the shell is measured over a period of time.

(13) When performing the constant pressure test, variations in atmospheric pressure must be taken into account. When performing either test, corrections must be made for any variation of the ambient temperature from the assumed

ambient temperature reference value of 30 °C (86 °F).

(14) The jacket of a vacuum-insulated double-wall tank must have either an external design pressure not less than 100 kPa (1 bar) gauge pressure calculated in accordance with the ASME Code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. Internal and external reinforcements may be included in calculating the ability of the jacket to resist the external pressure.

Note to paragraph (b): For the determination of the actual holding time as indicated by paragraphs (b)(11), (12) and (13) of this section, before each journey, refer to § 178.338–9(b).

(c) *Design criteria.* For shells with vacuum insulation, the test pressure must not be less than 1.3 times the sum of the MAWP and 100 kPa (1 bar). In no case may the test pressure be less than 300 kPa (3 bar) gauge pressure.

(d) *Service equipment.* (1) Each filling and discharge opening in portable tanks used for the transport of flammable refrigerated liquefied gases must be fitted with at least three mutually independent shut-off devices in series: the first being a stop-valve situated as close as reasonably practicable to the jacket, the second being a stop-valve and the third being a blank flange or equivalent device. The shut-off device closest to the jacket must be a quick closing device, which closes automatically in the event of unintended movement of the portable tank during filling or discharge or fire engulfment. This device must be operable by remote control.

(2) Each filling and discharge opening in portable tanks used for the transport of non-flammable refrigerated liquefied gases must be fitted with at least two mutually independent shut-off devices in series: the first being a stop-valve situated as close as reasonably practicable to the jacket and the second a blank flange or equivalent device.

(3) For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure relief must be provided to prevent excess pressure build-up within the piping.

(4) Each connection on a portable tank must be clearly marked to indicate its function.

(5) When pressure-building units are used, the liquid and vapor connections to that unit must be provided with a valve as close to the jacket as reasonably practicable to prevent the loss of contents in case of damage to the pressure-building unit.

(6) The materials of construction of valves and accessories must have satisfactory properties at the lowest operating temperature of the portable tank.

(e) *Pressure relief devices.* (1) Every shell must be provided with not less than two independent reclosing pressure relief devices. The pressure relief devices must open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. These devices must, after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts and must remain closed at all lower pressures. The pressure relief devices must be of the type that will resist dynamic forces including surge.

(2) Except for portable tanks used for oxygen, portable tanks for non-flammable refrigerated liquefied gases (except oxygen) and hydrogen may in addition have frangible discs in parallel with the reclosing devices as specified in paragraphs (e)(4)(ii) and (e)(4)(iii) of this section.

(3) Pressure relief devices must be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

(4) *Capacity and setting of pressure relief devices.* (i) In the case of the loss of vacuum in a vacuum-insulated tank or of loss of 20% of the insulation of a tank insulated with solid materials, the combined capacity of all pressure relief devices installed must be sufficient so that the pressure (including accumulation) inside the shell does not exceed 120% of the MAWP.

(ii) For non-flammable refrigerated liquefied gases (except oxygen) and hydrogen, this capacity may be achieved by the use of frangible discs in parallel with the required safety-relief devices. Frangible discs must rupture at nominal pressure equal to the test pressure of the shell.

(iii) Under the circumstances described in paragraphs (e)(4)(i) and (e)(4)(ii) of this section, together with complete fire engulfment, the combined capacity of all pressure relief devices installed must be sufficient to limit the pressure in the shell to the test pressure.

(iv) The required capacity of the relief devices must be calculated in accordance with CGA Pamphlet S–1–1.2 (incorporated by reference, see § 171.7 of this subchapter).

65. In § 178.703, paragraph (a)(1) introductory text would be revised and in paragraph (a)(1)(ii), a new sentence would be added at the end of the paragraph to read as follows:

§ 178.703 Marking of intermediate bulk containers.

(a) * * *

(1) Mark every IBC in a durable and clearly visible manner (may be applied in a single line or in multiple lines provided the correct sequence is followed) with the following information in letters, numerals and symbols of at least 12 mm in height and in the sequence presented:

* * * * *

(ii) * * * The letter ''W'' must follow the IBC design type identification code on an IBC when the IBC differs from the requirements in subpart N of this part, or is tested using methods other than those specified in this subpart, and is approved by the Associate Administrator in accordance with the provisions in § 178.801(i).

* * * * *

66. In § 178.705, paragraph (c)(1)(iv)(A) would be revised and a new paragraph (c)(1)(iv)(C) would be added to read as follows:

§ 178.705 Standards for metal intermediate bulk containers.

* * * * *

(c) * * *

(1) * * *

(iv) * * *

(A) For a reference steel having a product of Rm X Ao = 10,000, where Ao is the minimum elongation (as a percentage) of the reference steel to be used on fracture under tensile stress, (Rm X Ao = 10,000 X 145; if tensile strength is in U.S. Standard units of pounds per square inch) the wall thickness must not be less than:

Capacity (C) in liters[1]	Wall thickness (T) in mm			
	Types 11A, 11B, 11N		Types 21A, 21B, 21N, 31A, 31B, 31N	
	Unprotected	Protected	Unprotected	Protected
C ≤ 1000	2.0	1.5	2.5	2.0
1000 < C ≤ 2000	T=C/2000 + 1.5	T=C/2000 + 1.0	T=C/2000 + 2.0	T=C/2000 + 1.5

Capacity (C) in liters[1]	Wall thickness (T) in mm			
	Types 11A, 11B, 11N		Types 21A, 21B, 21N, 31A, 31B, 31N	
	Unprotected	Protected	Unprotected	Protected
2000 < C ≤ 3000	T=C/2000 + 1.5	T=C/2000 + 1.0	T=C/1000 + 1.0	T=C/2000 + 1.5

[1] Where: gallons = liters × 0.264.

* * * * *

(C) For purposes of the calculation described in paragraph (c)(1)(iv)(B) of this section, the guaranteed minimum tensile strength of the metal to be used (Rm_1) must be the minimum value according to material standards. However, for austenitic (stainless) steels, the specified minimum value for Rm, according to the material standards, may be increased by up to 15% when a greater value is provided in the material inspection certificate. When no material standard exists for the material in question, the value of Rm must be the minimum value indicated in the material inspection certificate.

* * * * *

67. In § 178.801, in paragraph (i), two sentences would be added at the end of the paragraph to read as follows:

§ 178.801 General requirements.

* * * * *

(i) * * * A large packaging, as defined in § 171.8 of this subchapter, may be used if approved by the Associate Administrator. The large packaging must conform to the construction standards, performance testing and packaging marking requirements specified in the UN Recommendations (incorporated by reference, see § 171.7 of this subchapter)

* * * * *

68. In § 178.812, paragraph (c)(1) would be revised and a new paragraph (c)(3) would be added to read as follows:

§ 178.812 Top lift test.

* * * * *

(c) *Test method.* (1) A metal or flexible IBC must be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes.

* * * * *

(3) If not tested as indicated in paragraph (c)(1) of this section, a flexible IBC design type must be tested as follows:

(i) Fill the flexible IBC to 95% full with a material representative of the product to be shipped.

(ii) Suspend the flexible IBC by its lifting devices.

(iii) Apply a constant downward force through a specially designed platen. The platen will be a minimum of 60% and a maximum of 80% of the cross sectional surface area of the flexible IBC.

(iv) The combination of the mass of the filled flexible IBC and the force applied through the platen must be a minimum of six times the maximum net mass of the flexible IBC. The test must be conducted for a period of five minutes.

(v) Other equally effective methods of top lift testing and preparation may be used with approval of the Associate Administrator.

* * * * *

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

69. The authority citation for part 180 would continue to read as follows:

Authority: 49 U.S.C. 5101–5127; 49 CFR 1.53.

70. Subpart G would be added to part 180 to read as follows:

Subpart G—Qualification and Maintenance of Portable Tanks

Sec.

Subpart G—Qualification and Maintenance of Portable Tanks

§ 180.601 Applicability.

This subpart prescribes requirements, in addition to those contained in parts 107, 171, 172, 173, and 178 of this subchapter, applicable to any person responsible for the continuing qualification, maintenance or periodic retesting of a portable tank.

§ 180.603 Qualification of portable tanks.

(a) Each portable tank used for the transportation of hazardous materials must be an authorized packaging.

(b) To qualify as an authorized packaging, each portable tank must conform to the requirements of this subchapter or the applicable specification to which the portable tank was constructed.

(c) The following portable tanks are authorized for use provided they conform to all applicable safety requirements of this subchapter: 51, 56, 57, 60, IM 101, IM 102 and UN portable tanks.

(d) A portable tank that also meets the definition of ''container'' in 49 CFR 450.3(a)(3) must conform to the requirements in parts 450 through 453 of this tile for compliance with Annex II of the Convention for Safe Containers (CSC).

(e) *Exemption portable tanks based on DOT 51 portable tanks.* The owner of a portable tank constructed in accordance with and used under an exemption issued prior to August 31, 1996, which was in conformance with the requirements for Specification DOT 51 portable tanks with the exception of the location of fill and discharge outlets, shall examine the portable tank and its design to determine if it meets the outlet requirements in effect on October 1, 1999. If the owner determines that the portable tank is in compliance with all requirements of the DOT 51 specification, the exemption number stenciled on the portable tank shall be removed and the specification plate (or a plate placed adjacent to the specification plate) shall be durably marked ''DOT 51–E*****'' (where ***** is to be replaced by the exemption number). During the period the portable tank is in service, and for one year thereafter, the owner of the portable tank must retain on file at its principal place of business a copy of the last exemption in effect.

§ 180.605 Requirements for retest, inspection or repair of portable tanks.

(a) A portable tank constructed in accordance with a DOT specification for which a test or inspection specified in this section has become due, may not be filled and offered for transportation or transported until the test or inspection has been successfully completed. This paragraph (a) does not apply to any portable tank filled prior to the test or inspection due date.

(b) *Conditions requiring test and inspection of portable tanks.* Without regard to any other test or inspection requirements, a Specification or UN portable tank must be tested and inspected in accordance with this section prior to further use if any of the following conditions exist:

(1) The portable tank shows evidence of bad dents, corroded or abraded areas,

leakage, or any other condition that might render it unsafe for transportation service.

(2) The portable tank has been in an accident and has been damaged to an extent that may adversely affect its ability to retain the hazardous material.

(3) The portable tank has been out of hazardous materials transportation service for a period of one year or more.

(4) The portable tank has been modified from its original design specification.

(5) The Department so requires based on the existence of probable cause that the portable tank is in an unsafe operating condition.

(c) *Schedule for initial and periodic inspections and tests.* Each Specification portable tank must be tested and inspected in accordance with the following schedule:

(1) Each IM or UN portable tank must be given an initial inspection and test before being placed into service, a periodic inspection and test at least once every five years, and an intermediate periodic inspection and test at least every 2.5 years following the last five-year periodic inspection and test.

(2) Each Specification 51 portable tank must be given a periodic inspection and test at least once every five years.

(3) Each Specification 56 or 57 portable tank must be given a periodic inspection and test at least once every 2.5 years.

(4) Each Specification 60 portable tank must be given a periodic inspection and test at the end of the first 4-year period after the original test; at least once every 2 years thereafter up to a total of 12 years of service; and at least once annually thereafter. Retesting is not required on a rubber-lined tank except before each relining.

(d) *Initial inspection and test.* The initial inspection and test of a portable tank must include the following:

(1) A check of the design characteristics;

(2) An internal and external examination of the portable tank and its fittings, taking into account the hazardous materials to be transported;

(3) A hydrostatic pressure test as specified in paragraph (i) of this section;

(4) A leakage test;

(5) A test of the satisfactory operation of all service equipment including pressure relief devices must also be performed. When the shell and its fittings have been pressure-tested separately, they must be subjected to a leakage test after reassembly. All welds subject to full stress level in the shell must be inspected during the initial test by radiographic, ultrasonic, or another suitable non-destructive test method. This does not apply to the jacket;

(6) A UN portable tank that meets the definition of ''container'' in the CSC (see 49 CFR 450.3(a)(2)) must be subjected to an impact test using a prototype representing each design type. The prototype portable tank must be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the maximum permissable gross mass of the fully loaded portable tank at a duration typical of the mechanical shocks experienced in rail transportation. A listing of standards describing methods acceptable for performing the impact test are provided in the UN Recommendations (incorporated by reference, see § 171.7 of this subchapter);

(7) The following tests must be completed on a portable tank that is also a CSC container without leakage or deformation that would render the tank unsuitable for transportation and use:

(i) *Longitudinal inertia.* The tank loaded to its maximum gross weight must be positioned with its longitudinal axis vertical. It shall be held in this position for five minutes by support at the lower end of the base structure providing vertical and lateral restraint and by support at the upper end of the base structure providing lateral restraint only.

(ii) *Lateral inertia.* The tank loaded to its maximum gross weight must be positioned for five minutes with its transverse axis vertical. It shall be held in this position for five minutes by support at the lower side of the base structure providing vertical and lateral restraint and by support at the upper side of the base structure providing lateral restraint only.

(e) *Intermediate periodic inspection and test.* The intermediate periodic inspection and test must include at least an internal and external examination of the portable tank and its fittings taking into account the hazardous materials intended to be transported; a leakage test; and a test of the satisfactory operation of all service equipment. Sheathing, thermal insulation, etc. need only to be removed to the extent required for reliable appraisal of the condition of the portable tank. For portable tanks intended for the transportation of a single hazardous material, the internal examination may be waived if it is leakage tested in accordance with the procedures in paragraph (i) of this section prior to each filling, or if approved by the Associate Administrator.

(f) *Periodic inspection and test.* The periodic inspection and test must include an internal and external examination and, unless excepted, a hydraulic pressure test as specified in this section. Sheathing, thermal insulation, etc. need only to be removed to the extent required for reliable appraisal of the condition of the portable tank. Reclosing pressure relief devices must be removed from the tank and tested separately. For portable tanks where the shell and equipment have been pressure-tested separately, after assembly they must be subjected together to a leakage test.

(g) *Exceptional inspection and test.* The exceptional inspection and test is necessary when a portable tank shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test must depend on the amount of damage or deterioration of the portable tank. It must include at least the intermediate inspection and a hydrostatic test according paragraph (e) of this section. Pressure relief devices need not be tested or replaced unless there is reason to believe the relief devices have been affected by the damage or deterioration.

(h) *Internal and external examination.* The internal and external examinations must ensure that:

(1) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for transportation;

(2) The piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including leakage, that might render the portable tank unsafe for filling, discharge or transportation;

(3) Devices for tightening manhole covers are operative and there is no leakage at manhole covers or gaskets;

(4) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened;

(5) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop-valves must be operated to demonstrate proper operation;

(6) Required markings on the portable tank are legible and in accordance with the applicable requirements; and

(7) The framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.

(i) *Pressure test procedures for specification 51, 57, 60, IM or UN portable tanks.* (1) Each Specification 57 portable tank must be leak tested by a

minimum sustained air pressure of at least three psig applied to the entire tank. Each Specification 51 or 56 portable tank must be tested by a minimum pressure (air or hydrostatic) of at least 2 psig or at least one and one-half times the design pressure (maximum allowable working pressure, or re-rated pressure) of the tank, whichever is greater. Leakage tests for all other portable tanks must be at a pressure of at least 25% of MAWP. During each air pressure test, the entire surface of all joints under pressure must be coated with or immersed in a solution of soap and water, heavy oil, or other material suitable for the purpose of detecting leaks, but in no case less than five minutes. The pressure must be held for a period of time sufficiently long to assure detection of leaks. During the air or hydrostatic test, relief devices may be removed, but all the closure fittings must be in place and the relief device openings plugged. Lagging need not be removed from a lagged tank if it is possible to maintain the required test pressure at constant temperature with the tank disconnected from the source of pressure.

(2) Each Specification 60 portable tank must be retested by completely filling the tank with water or other liquid having a similar viscosity, the temperature of which shall not exceed 100 °F during the test, and applying a pressure of 60 psig. The tank shall be capable of holding the prescribed pressure for at least 10 minutes without leakage, evidence of impending failure, or failure. All closures shall be in place while the test is made and the pressure shall be gauged at the top of the tank. Safety devices and/or vents shall be plugged during this test.

(3) Each Specification IM or UN portable tank, except for UN portable tanks used for liquefied compressed gases and all piping, valves and accessories, except pressure relief devices, must be hydrostatically tested with water, or other liquid of similar density and viscosity, to a pressure not less than 150% of its maximum allowable working pressure. UN portable tanks used for liquefied compressed gases must be hydrostatically tested with water, or other liquid of similar density and viscosity, to a pressure not less than 130% of its maximum allowable working pressure. The minimum test pressure for a portable tank is determined on the basis of the hazardous materials that are intended to be transported in the tanks. Minimum test pressure for specific hazardous materials are specified in the applicable T Codes assigned to a particular hazardous material in the § 172.101 Table of this subchapter. While under pressure the tank shall be inspected for leakage, distortion, or any other condition which might render the tank unsafe for service. A portable tank fails to meet the requirements of the pressure test if, during the test, there is permanent distortion of the tank exceeding that permitted by the applicable specification; if there is any leakage; or if there are any deficiencies. Any portable tank that fails must be rejected and may not be used again for the transportation of a hazardous material unless the tank is adequately repaired, and, thereafter, a successful test is conducted in accordance with the requirements of this paragraph. An approval agency shall witness the hydrostatic test. Any damage or deficiency that might render the portable tank unsafe for service shall be repaired to the satisfaction of the witnessing approval agency. The repaired tank must be hydrostatically retested. Upon successful completion of the hydrostatic test, the witnessing approval agency shall apply its name, identifying mark or identifying number in accordance with paragraph (l) of this section.

(j) *Rejection criteria.* When evidence of any unsafe condition is discovered, the portable tank may not be returned to service until it has been corrected and the pressure test is repeated and passed.

(k) *Repair.* The repair of a portable tank is authorized, provided such repairs are made in accordance with the requirements prescribed in the specification for the tank's original design and construction. In addition to any other provisions of the specification, no portable tank may be repaired so as to cause leakage or cracks or the likelihood of leakage or cracks near areas of stress concentration due to cooling metal shrinkage in welding operations, sharp fillets, reversal of stresses, or otherwise. No field welding may be done except to non-pressure parts. In all cases, when cutting, burning or welding operations on the shell have been affected, that work must be done with the approval of the approval agency and be done in accordance with the requirements of this subchapter, taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure must be performed after the work is completed.

(l) *Inspection and test markings.* Each portable tank must be durably and legibly marked, in English, with the date (month and year) of the last hydrostatic test, the identification markings of the approval agency witnessing the test when required, and the date of the last visual inspection. The marking must be placed on or near the metal identification plate in letters not less than 3 mm (0.118 inches) high when on the metal identification plate and 32 mm (1.25 inches) high when on the portable tank.

(m) *Record retention.* The owner of each portable tank or his authorized agent shall retain a written record of the date and results of all required inspections and tests, and the name and address of the person performing the inspection or test, until the next retest has been satisfactorily completed and recorded. In addition, a manufacturer's data report of the portable tank must be procured and retained in the files of the owner during the time that such portable tank is used for such service, except for Specifications 56 and 57 portable tanks.

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Robert A. McGuire,

Associate Administrator for Hazardous Materials Safety.

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